

The Semantics of the Future

by

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ABSTRACT

Natural languages use a number of different methods to refer to future eventualities: among them are futurates, as in (1a), and futures, as in (1b) and (1c).

- (1) a. The Red Sox (are) play(ing) the Yankees tomorrow.
- b. We'll change your oil in Madera.
- c. We're going to change your oil in Madera.

This dissertation uses evidence primarily from English, with additional data from Turkish and Indonesian, to argue that these methods all involve universal quantification over subsets of metaphysically accessible futures.

One factor in determining which worlds a modal quantifies over is the temporal argument of the modal's accessibility relation. It is well-known that a higher tense affects the accessibility relation of modals. What is not well-known is that there are aspectual operators high enough to affect the accessibility relation of modals. New data presented in this dissertation reveal the presence of aspectual operators located between TP and the future modal projection. The effects of these operators on truth and assertability conditions provide substantial information about the correct characterization of future modality, and indeed of modality in general. Furthermore, the very existence of such aspectual operators raises questions about how aspect is represented in the semantics, if, as is generally assumed, aspectual operators take event arguments, which do not occur outside of the verb phrase.

In addition, the ordering source in futures is found to be determined in some cases by animate entities' abilities and commitments (bouletic ordering sources), and in other cases by more general properties of the world (inertial ordering sources). Since other modals in other languages seem to share this property, a unification of the two kinds of ordering sources is proposed.

Thesis Supervisor: Sabine Iatridou

Title: Professor of Linguistics

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Futurism — The Trendiest Profession
-*Newsweek* headline, March 2, 1998

On my family's very first computer, a Tandy TRS-80 that we got in 1982, there was a program called "dissertation." When you typed in RUN DISSERTATION, the screen would scroll a lot of gobbledegook that could only be stopped by hitting the BREAK key. I thought this was fascinating. It was second only to making the computer sound like it was falling down the stairs by typing individual letters into the primitive speech synthesis program, another favorite pastime. But the result of this was that for a number of years I thought that the word *dissertation* actually meant 'a lot of gobbledegook'. I see now that I was not entirely wrong. But to the extent that any part of this particular dissertation fails to be gobbledegook, the following people are to thank.

I have been lucky to have had Sabine Iatridou as my committee chair. She is blessed with stunningly precise aspectual and modal intuitions, and a great gift for making them all lie flat. She has consistently militated against gobbledegook in my thinking and in my prose. She has encouraged me to trust my instincts. More than anything, throughout this process she constantly and vociferously expressed her belief in me, in a tone that brooked no dissent.

Speaking of dissent, I have been privileged to learn first-hand that Noam Chomsky is as brilliant as they say. He has an unwillingness to take assumptions for granted, an unwillingness that has had a big impact on this dissertation. I have been both helped and inspired by Noam's compassion, his optimism, and his voracious interest in things that he does not personally work on. I sometimes forget that in his spare time he is famous.

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I might have asked Norvin Richards (the syntactician, not the ethicist, though the ethicist is a nice guy too) to be on my committee, were it not for the fact that he is a dear friend. As a syntactician, he has answered my questions at all hours of the day and night. As an Algonquianist, he has made me glad that I do not work on Algonquian languages. And as a chocolate aficionado, he has provided all of us with M&Ms; I know I join others in the department in expressing thanks from the bottom of my stomach.

Someone else who I would have wanted to ask to be on my committee was Ken Hale. His passing last fall was a cruel loss in a season of cruel loss. Ken taught me so much, by his

own example more than anything, about how to do theoretical work on minority languages, while respecting the people who speak them. His boundless kindness and many talents are legendary. Like everyone else who knew him, I miss him tremendously.

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Joseph 'Jofish' Kaye, Becky Marshall, and Elena Guerzoni all lent me their editorial expertise on part or all of the text, for which I am grateful (you should be too). Thanks as well to Cristina Cuervo and Linnaea Stockall at MITWPL.

This dissertation would have been quite short without data. I have been lucky enough to work with many astute consultants, both linguists and non-linguists. By language, they are: Eric Albert, Joseph "Jofish" Kaye, Sharon Teitlebaum, and too many speakers at MIT to thank here (English); Sabine Iatridou (Greek); Wendy Ham, Yonathan Thio, Diana Yuliyanti, and Natanael Perangin (Indonesian); Ken Hiraiwa, Toshiyaki Inada, Shinichiro Ishihara, Kimiko Nakanishi, Shigeru Miyagawa, and Shogo Suzuki (Japanese, and while we're on the topic I'd like to thank my Japanese teachers, senseis Nagaya, Yamamoto, Ikei, and Hatano); Albert Alvarez and Ofelia Zepeta (Tohono O'odham); and Meltem Kelepir and Gülsat Aygen (Turkish).

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To the memory and legacy of Ken Hale

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Chapter 1

Introduction

So far, then, as I have anything that you could call a philosophical creed, its first article is this: I believe in the reality of the distinction between past, present, and future. I believe that what we see as a progress of events *is* a progress of events, a *coming to pass* of one thing after another, and not just a timeless tapestry with everything stuck there for good and all.

-Arthur Prior
"Some free thinking about time," about 1958

Those who say that there is no time like the present are quite correct; the present is indeed a very special time. It has the distinction of being the only time graced by our presence, effectively dividing the timeline in two. On one side of the divide are times that have, in a sense, happened to us, and on the other side are times that, in a similar sense, have not yet happened to us. We speak quite frequently about this other side, the future, using sentences that convey varying shades of certainty and uncertainty.

At first glance, it is not too puzzling why we would speak of the future with uncertainty. What is more puzzling is how we speak of it with as much confidence as we do. The topic of this dissertation is the meaning of those sentences which express a high degree of certainty about the future, such as the expressions in (2):

- (2) a. The Red Sox are playing the Yankees tomorrow.
- b. The Red Sox play the Yankees tomorrow.
- c. We're going to change your oil in Madera.
- d. We'll change your oil in Madera.

As befits the topic, I will be speaking with varying degrees of certainty and uncertainty. One of the more certain results is that future reference in the languages studied involves metaphysical modality — also referred to as a branching future — quantification over worlds that are identical with the actual world up to and including the present.

Two themes justify this certainty: The first has to do with who or what controls the future. We will find that the constructions we will be examining presuppose that someone, or something, determines what happens in the future. We will call this entity a “director.” There are commitments of animate directors, and of the world in general, that are presupposed to render an outcome inevitable. As we will discuss at length below, the semantics of commitment requires modality. The second theme has to do with how aspectual properties affect the proposition expressed about the future. In order for the denotations to work out correctly, there must be a modal element to the future reference; the modality associated with commitment does nicely.

This research touches on an age-old debate about whether there is one future, and we are just uncertain about what happens in it, or whether there is no single future, and speaking of the future necessarily involves reference to branching future possibilities rather than future actualities.¹ Oddly enough, even though there is ample evidence for the latter, it turns out that the constructions in question quantify only over worlds that are presupposed to agree with the future — those that agree with the commitments of the entity presupposed to have control over what happens. All the evidence pointing to modality in futures and futurates only bears on the commitment modality. Where we need to refer to the “real” future in the semantics, there is no evidence bearing on the question of whether it is a single future or a branching future.

The data studied is primarily English, though cross-linguistic similarities and differences

¹Cf. Aristotle's *Physics*, Prior (1967, 1957); Thomason (1970)

in several languages (Greek, Indonesian, Turkish, etc.) are pointed out. The similarities are striking, and the hypothesis is that they may indicate universal properties. These interest us inasmuch as they reveal properties of the human language faculty and its interface with the cognitive-perceptual system; thus this research can be considered a part of the Minimalist Program (Chomsky, 1993, 1995, 2000, 2001). However, it is far from a comprehensive survey, and there are languages that may provide counterexamples, so the hypothesis of universality in this domain will have to remain a hypothesis for now.

Before getting to the details of the project, I would like to present some background. There are a number of formalisms designed for issues of tense, aspect, and modality in general. These tools are set out in section 1.1. Section 1.2 is an overview of the dissertation.

1.1 Tools

The semantics practiced in this dissertation is of the compositional kind, in which it is assumed that the meaning of a sentence depends on the meaningful parts of the sentence and how they are put together.² Here I briefly introduce some of the formal tools I will be using in constructing a compositional theory of the future-referring constructions in question. For a more detailed introduction to these topics, the reader is referred to the sources cited below.

1.1.1 Syntactic assumptions

I assume a minimalist, Minimalist syntax. That is, my assumptions are inherited from the Minimalist Program, but are intended to be easily ported to any other syntactic framework; nothing hinges on Minimalism per se.

1.1.2 The intensional system

However one represents the future formally, one cannot avoid making some kind of reference to times. As I mentioned above, I will also provide evidence that modality is a necessary part of the meaning of the future constructions under investigation; therefore worlds are

²And, of course, context, though we will not be touching on the nature of contextual influences very much in what follows.

required in our system as well. The intensional system we will use to incorporate worlds and times into the semantics is based on the extensional framework of Heim and Kratzer (1998), in the Montagovian tradition. As usual, there is a valuation function “[]^g” that takes a morphosyntactic object and a variable assignment *g*, and returns a denotation. Times are type *i*, variables *t*, *t*′, etc; worlds are type *w*, variables *w*, *w*′, etc. For convenience more than anything else, I will treat these variables as being part of the object language, appearing in the compositional structure, and speak of a “time *t*” rather than a “time assigned to *t* by the variable assignment *g*.” Truth values (1,0) are type *t*, predicates of worlds use variables *P*, *Q*, etc. and are of type $\langle w, t \rangle$, and propositions use variables *p*, *q*, etc., and are of type $\langle w, \langle i, t \rangle \rangle$.³ A *v*P or larger phrase whose denotation is a proposition is expressed by an italicized letter (*p*, *q*, etc.), and its denotation is expressed by the same letter not italicized (*p*, *q*, etc.).

I will assume the *v*P-internal subject hypothesis (Koopman and Sportiche, 1991; Kitagawa, 1986; Fukui and Speas, 1986; Kuroda, 1988), and ignore movement of the subject out of the *v*P; eschewing this and other movements will enable us to forgo discussion of mechanisms for movement, changing of variable assignments, and so forth.

1.1.3 Tense, aspect, and temporal adverbials

The terminology of temporal and aspectual semantics is somewhat forbidding. There is an inherited set of terms from traditional grammar and intuitive notions (“imperfective,” “aorist,” “past,” “event,” e.g.) and often some confusion about whether a term is to refer to a piece of morphology (whatever its meaning), or a piece of meaning, or a particular reading of a sentence. In addition, because there is not yet agreement in the field on what the primitives are and how they should be defined, there is a danger of misunderstanding if we leap in without making explicit the definitions and assumptions to be used.

So let us try to do so here. First, let us consider times. I assume that the timeline is dense; in general, times are not indivisible points, i.e., instants, but rather, intervals that can be divided into ever-smaller subintervals. The times that are referred to by variables

³I agree with Stalnaker (1998, 1999), e.g., that a sentence does not denote a proposition itself, but rather a function from contexts of utterance into propositions. But since the influence of context on “what is said” will be of little relevance to us, I will gloss over this role of context.

in our system are thus intervals, not instants.

Functions that take temporal arguments are denoted in several ways. If they are associated with a piece of overt morphology, they can be denoted as usual as the result of applying the evaluation function $\llbracket \cdot \rrbracket^g$ to the morphology. So the meaning of the progressive *be -ing* can be written as $\llbracket be -ing \rrbracket^g$. But because temporal predicates are prone to having allomorphs, going unpronounced, and (like *be -ing*) being subject to affix hopping (Chomsky, 1957), it will be convenient to write a name for that function in small caps: PAST, PROG, and so on. And as mentioned earlier, the meaning of a proposition p will generally be written as p , though it could also be written as $\llbracket p \rrbracket^g$.

I will assume that morphemes associated with times are generally operators; they existentially bind a time, instead of taking a temporal pronoun as an argument, as in Partee (1984); von Stechow (1995); Kratzer (1998). Nothing in particular hangs on this assumption, however.

Throughout this dissertation I will skirt many of the issues surrounding the introduction of event arguments into the structure. I believe that in this case it is worth forgoing the many advantages of using event arguments (Davidson, 1997), in order to keep the exposition as simple as possible. This system could be altered to use event variables without too much trouble; the one major trouble that would arise is interesting, and is discussed in part below. I will, however, speak informally of events.

I will consider *vPs*, which in an event-based semantics might be a predicate of events, to “describe an eventuality,” (where *eventuality* is a cover term for events and states) despite the fact that in the formal system we will be using, they do nothing of the sort, being of type $\langle w, \langle i, t \rangle \rangle$. *vPs* can be (*lexical*) *statives* or *eventives*. I will assume that the reader is familiar with Vendler’s (1967) classification of eventualities into *achievements*, *accomplishments*, *activities*, and *states*, and with the opposition between *imperfective* aspect and *perfective* aspect. (In English, for example, the simple form of the verb has both a perfective and a generic reading.) The reader is referred to Smith (1991) for a detailed introduction to these concepts.

I will use the phrase *tense morpheme* or *temporal morpheme* to refer to those morphemes (or lack thereof) whose meaning yields either past or present temporal location of the

eventuality. *Aspect* or *aspectual morpheme* will refer to morphemes associated with temporal properties other than location; these properties are *aspectual properties*.

One aspectual property which turns out to be significant to the study of future constructions is Dowty's (1979) *subinterval property*. A predicate p of times has the subinterval property if and only if for all times t , for all subintervals t' of t , the truth of $p(t)$ entails the truth of $p(t')$. Thus a predicate of times such as $\llbracket \text{John be here} \rrbracket^g(w)$ has the subinterval property, since John's being here over an interval t entails that $\llbracket \text{John be here} \rrbracket^g(w)$ in the context is true at all subintervals of t . If $\llbracket \text{John bake a cake} \rrbracket^g(w)$, on the other hand, is true of an interval t , it is not true of all the subintervals t' of t that $\llbracket \text{John bake a cake} \rrbracket^g(w)$ is true at t' .

The subinterval property survives in more recent work as a property of predicates of events; most notably in Krifka's *cumulativity* property (see Krifka (1992, 1998)). Indeed, recent theories of aspect most often take aspectual morphemes to have denotations that take event arguments, not temporal arguments. This move has been very useful in explaining, for instance, the influence of objects on aspectual properties. One point I will make, however, is that we must be very careful about whether we want to treat the subinterval property as a property of predicates of events, simply because it turns out to be relevant to predicates — namely, modals — that could not possibly be predicates of events. We will see examples of this phenomenon throughout the dissertation. The simplest way to avoid this problem is to take events out of the picture, and retain Dowty's original conception of the subinterval property as a property of predicates of times, even though we lose the explanatory power that event arguments afford for other data.

Note that once we make this move, there is in principle no reason to exclude predicates of times that are not verb phrases: tenses, quantifiers over times, and so on. It will turn out to be useful, in fact, to include them in the set of predicates that can have the subinterval property. For now, here is some evidence that it is at least not problematic. Consider the well-known fact that the sentence in (3) cannot have the gloss given.

- (3) Zoe builds a tower.
≠'Zoe is building a tower.'

Eventives such as *leave* cannot hold of the present, while lexical and derived statives (pro-

gressives and generics), as in (4), can do so. We can verify independently that these latter predicates have the subinterval property; in all cases, for any interval that the predicate holds of, it also holds of any subinterval of that interval.

- | | | | |
|-----|----|------------------------------------|-----------------|
| (4) | a. | Zoe is asleep. | lexical stative |
| | b. | Zoe is building a tower. | progressive |
| | c. | Zoe builds a tower each afternoon. | generic |

Let's abbreviate "subinterval property" as "SIP", and assume that the grammar can somehow tell whether a predicate is +SIP or -SIP (here a theory similar to Krifka's, but for times, would be quite useful, but let us simply assume that it could be done). Then we might rule out -SIP predication of *now* as follows:

- (5) *Present -SIP constraint.*

For all worlds *w*, for -SIP predicates of times *P*,
P(now) is undefined.

Constraints like this one have been proposed in many different discussions of this effect. However, it is not typically mentioned in such discussions that past tense sentences behave like the lexical and derived statives in this respect. The past tense morpheme can take *now* as an argument; *now* is the time that the eventuality is asserted to precede.

- (6) Zoe built a tower.

If we consider the subinterval property as Dowty states it, it is clear that past tense phrases have the subinterval property. Suppose that it is true throughout today that Zoe built a tower. Then it is true at any part of today that Zoe built a tower. Thus treating the subinterval property as a property of *any* predicate of times, including PAST, does not contradict the present -SIP constraint. In the following chapters, we will see where the extension of the subinterval property to temporal predicates such as tenses is not only harmless, but useful.

One final note about a piece of technical machinery that I will not be using. Situations are, intuitively, a part of a world, and some important generalizations can be captured by formalizing the intuitive notion (Barwise and Perry, 1983; Kratzer, 1989). I will not be

including situations in the logical forms in this dissertation. This omission is made chiefly for the goal of simplicity of exposition, not because of any failing of situational theories. There are two ways in which situations would in fact be quite helpful in accounting for the facts that I will be presenting. The first is that situation arguments are more plausible as arguments of modals than are event arguments, and therefore might be a good compromise between an event-based subinterval property and a time-based subinterval property. The second is that they are very useful in explaining certain properties of generics; a generic is often taken (as in Chierchia (1995); Kratzer (1989), e.g.) to involve universal quantification over situations. Although I will call upon, e.g., indefinite interpretation data to show whether a generic operator is present, in the formal system I will leave treat generics as quantifiers over times, with the understanding that situational quantification is probably closer to the right treatment.

1.1.4 Talking about times

Earlier research into tense and aspect has provided us with a dazzling number of metalinguistic terms for times: for example, Event Time, Reference Time, and Speech Time; or Time of Situation, Time of Topic, and Time of Speech, (Reichenbach, 1947; Klein, 1997). Unfortunately, such terms are often used in different ways by different writers. Furthermore, in the current project we will actually need more times than the usual three. We could avoid naming them altogether, and speak only in formalisms, but we would miss some important generalizations that way, and give ourselves headaches as well. So it looks like we should create new names for the times we will be interested in. On the other hand, I am sympathetic to the plight of the reader; it is often dismaying to find that one has to memorize a whole new set of unfamiliar names for familiar times in order to read someone's work.

I will refer to times according to their position in the sentence. We can view a time either as input or output of a function, or as input to or output of (a function in) a particular location in the structure. A time in any particular sentence may thus have three (!) names: as the output of a function, the input of a function, and the input to (a function in) a

particular chunk of phrase structure.⁴ The redundancy turns out to be desirable, as we will see. Some generalizations benefit from reference to relationships between times and lexical items, and others benefit from reference to relationships between times and syntax. The hope is that this nomenclature will be as transparent as possible, and will not require great feats of lexical access on the part of the reader.

Consider then a piece of morphology whose denotation is a function that requires at least a time and a proposition in order to be completely saturated, and which existentially binds a different time, such that the proposition is applied to that different time. Here is such a function.

$$(7) \quad \lambda p.\lambda w.\lambda t. \exists t': [t' < t \ \& \ p(w)(t')]$$

The input (temporally speaking) of this function is t ; the other time, t' , we will call the output. Since this particular function has the name PAST, we would call t the PAST input and t' the PAST output.⁵

If PAST is sitting in T, we could also call t the TP input (assuming there is nothing in the specifier of TP that affects the time). If it is somewhere different, say, in C, t is not the TP input but the CP input. It would still, of course, be the PAST input.

Finally, I have found it impossible to avoid reference in the text to the time over which an eventuality happens. I am on the side of those who argue that this time is not represented in the object language, and yet in the metalanguage it is quite useful to be able to talk about it.⁶ Something intuitive is really called for here. I will throw up my hands here and follow the event grammar convention of calling it the *run time*.

1.1.5 Modality

In addition to times, we also need to consider how to deal with modality. I will assume that Kratzer (1991) (drawing in part on Lewis (1968, 1973, 1975)) is essentially correct

⁴While we could refer to the output of a particular chunk of phrase structure as well, we will not have any reason to do so.

⁵I will not worry about the valuation function too much in this nomenclature. PAST is indeed a function, but *woll* (the modal component of *will*), for example, is a piece of object language; the corresponding function is $\llbracket woll \rrbracket^g$. Nonetheless I will talk about inputs to and outputs from *woll*.

⁶This interval could also be referred to as the verb input, but with futarates (chapter 2) this becomes problematic; is the input to the verb the time of the plan or the time the eventuality is to happen?

about the meaning of modals, in saying that they are quantifiers over worlds. Kratzer's theory abstracts away from the temporal dimension (as do the modal logics upon which her theory is based); let's take a look at her theory before attempting to juggle worlds and times together.

There are two components in Kratzer's theory that determine the set of worlds to be quantified over in any particular case: the modal base, and the ordering source.

1.1.5.1 The modal base

It is clear that one modal can have several different meanings. For example, the sentence in (8) has two readings, one in which the speaker is deducing from the available facts that Eric is at home, and one in which the speaker is expressing a normative statement; Eric must be home according to some set of rules, or the like.

(8) Eric must be at home.

In both of these readings, the force of the quantification is universal, but there is still a difference. For Kratzer, this difference is that the readings involve quantification over different sets of worlds.

To determine which set of worlds the modal quantifies over, Kratzer invokes sets of propositions called *conversational backgrounds*. Propositions are sets of worlds, so a conversational background is a set of sets of worlds. The intersection of the sets of worlds is the set over which the modal quantifies. The worlds in that set, the *modal base*, can also be thought of as the worlds in which all the propositions in the conversational background are true. In any case, these are called the *accessible* worlds, with respect to a particular conversational background; the conversational background is said to provide an *accessibility relation*.

Among the modals Kratzer considers, are two modal bases: the *circumstantial* bases and the *epistemic* bases. A circumstantial base is a set of facts about the actual world. The circumstantial base that will interest us the most is what Kratzer calls a totally realistic circumstantial base: one that includes all the propositions that are true in the actual world. Taking a cue from Thomason (1970) (discussed below), let's use a shorter name for this

modal base: the *metaphysical* base. The epistemic base, on the other hand, includes only the propositions that are known (by someone) about the actual world.

It is easy enough to distinguish these two modal bases, in the most straightforward cases. Suppose we consider a slice of a world at which Delaney is at home but Mike doesn't know it. Then the set of metaphysically accessible (i.e., totally realistically circumstantially accessible) worlds would not contain any worlds in which Delaney is out doing her shopping, while the epistemically accessible worlds according to what Mike knows could contain such worlds.

1.1.5.2 The ordering source

As Kratzer points out, a modal base alone is not sufficient to account for certain kinds of modality. Consider a conversational background consisting of the following propositions:

- (9) a. There are no murders.
- b. If there is a murder, the murderer goes to jail.

Such a conversational background is intuitively perfectly reasonable as a set of laws, albeit a small one. But consider the set of worlds that would be in a modal base built from this conversational background. In it are only worlds in which both (9a) and (9b) are true. As Kratzer points out, anything would be true in such a world. This cannot be the right set of worlds; if it were, then a sentence *John must not kill Jane*, using the modal base based on (9), would express that John does not kill Jane in all of these bizarre worlds. This is a silly result.

The conflict arises because the set of propositions expressed in (9) contains a proposition demarcating an ideal state of affairs, as well as what to do if the ideal is not met. Intuitively, what we want a sentence like *John must not kill Jane* to mean is that on all the ideal worlds — those in which there are no murders — John does not kill Jane. This would be easy if (9a) were the only proposition in the modal base. But we also want the law to provide for the appropriate punishment if John does kill Jane. That is, if John kills Jane, *John must go to jail* ought to denote something true.

Kratzer's solution is to implement an additional role for conversational backgrounds like the one in (9). Conversational backgrounds can still provide modal bases, as before; but

they can also provide partitions of the accessible worlds into different sets, with the sets ranked as to how good they are with respect to an ideal. Then the quantification is over the best circumstantially accessible worlds.

Returning to the murder case to see how this proposal works: If there are no murders in the world in which the modal is evaluated, then the best worlds are the absolute ideal worlds: i.e., all those worlds in which there are no murders. However, if in the actual world, John kills Jane, then given that the circumstantially accessible worlds must agree with the actual world on relevant facts, and assuming that John's offering Jane is relevant here⁷ — the best we can do among the circumstantially accessible worlds is the set of worlds in which John goes to jail. Universal quantification over this set will entail that the denotation of *John must go to jail* is true, as desired.

We will use two kinds of ordering sources in later chapters: *bouletic* ordering sources, based on the commitments of an animate entity, and *inertial* ordering sources, based on Dowty's (1979) concept of inertia worlds. These ordering sources will be discussed in detail as they come up.

1.1.6 Branching futures: times and worlds

Having laid out the available technologies for times and worlds, we will now start putting them together. How do times and worlds relate to each other in the model? And in particular, how do future times and worlds relate to each other in the model?

It seems unobjectionable to say that there is some sort of indeterminacy — that is, modality — in expressions that talk about the future. The real question is the nature of that modality. If there is an actual future, just as there is an actual past, any modality must surely be epistemic. So there is no special modality about future times that is not shared by non-future times. There is a fact of the matter about the future, but we just don't know what it is. On the other hand, if there is no fact of the matter about the future, the modality involved might well be metaphysical. Then future times would have to involve a kind of modality not available for non-future times.

There seems initially to be no obvious evidence for one view or the other. The call

⁷Or assuming, as Kratzer puts it, that one function of the *if*-clause is to restrict the modal base.

seems to come down to philosophical preference, or indeed a creed, as in the epigram from Arthur Prior at the beginning of the chapter. Later I will argue that the modality involved in the future-oriented expressions is different from either one of these options; the worlds being quantified over are neither all the epistemically accessible nor all the metaphysically accessible worlds.

Leaving this question for subsequent chapters, however, we still need to lay out the basics of how times and worlds interact in any modal that has both.

First of all, we need to relativize the accessibility relation of modals to times, as many have previously noted. If we say that Eric must be at home, the propositions that are relevant are only those about his present obligations, or what is presently known, not about his past obligations, for instance, or what was formerly known. Another way of putting this fact is that temporal location affects which set of worlds gets quantified over. In this dissertation we will see that the modal's being relativized to an input interval can also explain otherwise mysterious interactions between aspectual properties and the set of worlds quantified over.

Thomason (1970) (decidedly on the metaphysical side of the future debate) provides a formal system for temporally-relativized modality, drawing in part on technology from Frassen (1966). A version of Thomason's future operator is given in (10).

(10) (Thomason, 1970)

$$\begin{aligned}
 &\text{For any instant } i \text{ and world } w, \llbracket \text{FUT } q \rrbracket^g(w)(t) \\
 &= 1 \text{ if } \forall w' \text{ that agree with } w \text{ up to } t: \\
 &\quad \exists t': t < t' \text{ and } q(w')(t') = 1; \\
 &= 0 \text{ if } \forall w' \text{ that agree with } w \text{ up to } t: \\
 &\quad \neg \exists t': t < t' \text{ and } q(w')(t') = 1; \\
 &\text{and is undefined otherwise.}
 \end{aligned}$$

The definition in (10) says that for any instant t and world w , $\llbracket \text{FUT } q \rrbracket^g(w)(t)$ is defined just in case all the worlds share a truth value for q at the time in question. Then, if $\llbracket \text{FUT } q \rrbracket^g(w)(t)$ is defined, it is true if on all worlds that agree with w up to t , there is some time t' that is later than t , at which q is true; and it is false if on all worlds that agree with w up to t , there is no time t' that is later than t at which q is true.

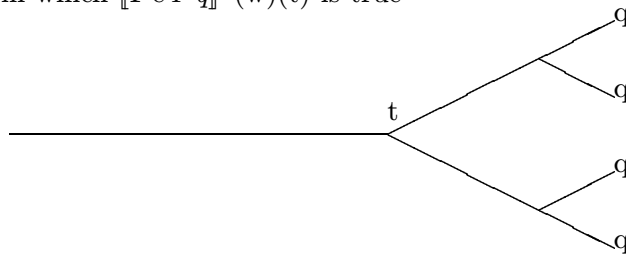
It will be of interest to us later to note that his definition is as complex as it is in part to capture the fact that future statements exhibit an excluded middle; (11a) asserts that all the worlds are sea-battle-tomorrow worlds, and (11b) asserts that all the worlds are non-sea-battle-tomorrow worlds. (11b) does not assert that not all the worlds are sea-battle-tomorrow worlds (the examples date to Aristotle *Physics*).

- (11) a. There will be a sea battle tomorrow.
 b. There won't be a sea battle tomorrow.

Thomason's definition accounts for this fact by presupposing that the worlds are either all q worlds or none of them are. In chapter 2 I will motivate a different means to that end.

If we were to envision worlds as timelines, and disagreement between two worlds as a binary branching, we might represent the set of worlds quantified over by FUT, evaluated at t and the actual world. The diagram below shows a state of affairs in which $\llbracket \text{FUT } q \rrbracket^g(w)(t)$ is true.

- (12) A case in which $\llbracket \text{FUT } q \rrbracket^g(w)(t)$ is true



Although we will deal with the excluded middle in another way, so will not need all of the complexity in his future operator, we will be using a concept of the branching future similar to Thomason's.

1.2 Overview

Now that we have seen the formal tools that will inform the analysis, here is a brief overview of what the analysis will encompass.

As I have said, the goal of this dissertation is to investigate the meanings of the ways that we can talk about the future with a high degree of confidence. As this is a project in compositional semantics, we will be trying to find out both the meanings of parts of sentences, and how the parts are put together to form the meaning of the whole sentence. We will find that the future elements have presuppositional, modal, and aspectual components. Therefore we will want to determine what each of these components is for each way of talking about the future. We will then want to investigate the structures these components are in; how they are put together into logical forms.

These ways of talking about the future turn out to have a lot in common. They share a presuppositions that someone or something controls the future; a universal metaphysical modal with similar ordering sources; and aspectual operators that affect the modal properties of the sentence. Their differences lie in their ordering sources, their aspectual operators, the scope of the modal, and a curious split (between futurates and futures) that we will not be able to define precisely here.

Chapter 2 begins our journey into the future with sentences that have no specifically future inflectional morphology. Such sentences are called *futurates*, and their properties are somewhat surprising. Two examples of futurates are given in (13); “simple” here is not a comment on the transparency of the meaning of (13b), but on the morphological fact that the verb has no overt aspectual morphology.

- (13) a. Progressive futurate: The Red Sox are playing the Yankees tomorrow.
b. Simple futurate: The Red Sox play the Yankees tomorrow.

I argue that futurates have a *direction presupposition*: a presupposition that an entity, the *director*, can see to it that the eventuality described by the proposition either takes place, or does not take place. The assertion is simply that the director is committed to making the eventuality to happen, where the director’s commitments provide the bouletic ordering source for the modal. Futurates without directors are treated with an inertial ordering source, drawing on earlier proposals regarding inertia worlds (Dowty, 1977, 1979). There are various aspectual operators involved in the meaning of futurates as well; progressive aspect in (13a), and, I argue, generic aspect in (13b).

In chapter 3 I take up the issue of *will* and *be going to* and their close relatives in a

handful of other languages: how are they the same, and how are they different? I find that *will* behaves similarly to simple forms, in both their generics and perfective manifestations, and that *be going to* behaves similarly to progressives, in a number of ways. I show how the subinterval property or lack thereof on various parts of the clause affects which future worlds are quantified over. The modal properties of futures thus constitute important evidence for both a modal and an aspectual component in future semantics.

Chapter 4 looks more closely at futurities, *will*, and *be going to* in conditionals in English, and how aspect affects modality. The data examined tell us about the syntactic structure of different conditionals, and in particular, the relative scope of certain modals in the sentence, both overt and covert. One side effect of this discussion is a section distinguishing two types of conditionals according to the temporal interpretation of their antecedents and consequents.

Chapter 5 looks back at the questions answered, and those raised, by this research.

Chapter 2

Futurates

The future is no more controllable than it is predictable.
The only reliable attitude to take toward the future is
that it is profoundly, structurally, unavoidably perverse.

-Stewart Brand
How Buildings Learn, 1995

A *futurate* is a reading of a sentence with no obvious means of future reference, which nevertheless has a future-oriented eventuality that must be plannable (in some sense to be made more precise). The sentences in (14) and (15) are examples of futurates. The (a) examples, which discuss a plannable event (a baseball game), are far more acceptable than the (b) examples, which refer to an unplannable event (the Red Sox's winning).

- (14) a. The Red Sox play the Yankees tomorrow.
b. # The Red Sox defeat the Yankees tomorrow.
- (15) a. The Red Sox are playing the Yankees tomorrow.
b. # The Red Sox are defeating the Yankees tomorrow.

The (a) examples convey, roughly, that there exists a plan for the Red Sox and the Yankees to play tomorrow; the (b) examples, however, are decidedly odd. By comparison, there is nothing odd about (16):¹

¹Lest the reader object that there *is* something a little odd about (16), I would point out that at the time I wrote this, the Red Sox were 7 and 7 against the Yankees for the season.

(16) The Red Sox will defeat the Yankees tomorrow.

The oddness of (14b) and (15b), as compared to (16), seems to stem from the fact that the winner of a baseball game is (usually) not decided ahead of time. The sentences in (14b) and (15b) improve markedly in a context where it is presupposed that the winner *can* be decided ahead of time, for instance, if we are allowed to consider the possibility that someone has fixed the game.²

As can be seen in (14) and (15), in English both simple and progressive forms have futurate readings.³ There are a number of differences between the progressive futurate and the simple futurate that will be pointed out. We will mainly be concerned with what the progressive futurate and simple futurate have in common, however, until we have developed a hypothesis about futurate meaning.

In the first section of this chapter, I develop an analysis of the basic modal content of futurate meaning. Beginning from an initial, quite conservative hypothesis of the meaning of futurates (Copley, 2001b), I present a theory that overcomes some deficiencies of the initial hypothesis. In section 2.2, I take up the question of which morphemes (pronounced or unpronounced) are responsible for the meaning arrived at in section 2.1. The modality of futurates, I argue, is exactly the modality we see in the aspectual-modal progressive and generic morphemes. The conclusion of the chapter is in section 2.3.

2.1 Futurate meaning

The question of modality in the meaning of futurates proves to be a central one, and hence our first concern. In section 2.1.1, we will verify that it is quite impossible to do without modality in the meaning of futurates, and give a first approximation of the character of that modality. We will see in section 2.1.2 that there are problems with that characterization, and hasten, in section 2.1.3, to set about fixing them.

²Early work on futurates includes Prince (1971); Lakoff (1971); Binnick (1971a,b); Vetter (1973); Hudson (1977), and Dowty (1979, 1977). More recent efforts are in Landman (1992); Cipria and Roberts (2001). See Binnick (1991) for an overview.

³If the English simple form is a perfective in this case, this is unusual cross-linguistically; perfectives do not normally have futurate readings. However, in section 2.2.3, I will argue that the simple form has a futurate reading only by virtue of having a generic reading — another property the English simple form would not be expected to have if it were only a perfective.

2.1.1 An initial hypothesis

Consider again the futurate contrast in (15), repeated below.

- (17) a. The Red Sox are playing the Yankees tomorrow.
b. # The Red Sox are defeating the Yankees tomorrow.

As noted above, the sentence in (17a) seems to say that there is a plan for the Red Sox to play the Yankees tomorrow. But is this plan “just” somehow part of the pragmatics, or can a case be made for putting some formal representation of the plan in the semantics of (17a,b)? And if so, what would such a representation look like?

To the first question we may answer a quick affirmative. The existence of a plan in futurates matters, at the very least, to temporal predicates; the time over which the plan is asserted to hold is constrained by tense and can also be constrained by a temporal adverbial. The utterance in (18) seems to convey that at some time in the past, for a period of two weeks, there was a plan for the Red Sox to play the Yankees today.

- (18) For two weeks, the Red Sox were playing the Yankees today.

The semantics of futurates will thus need to refer to at least the duration of the aforementioned plan.

The propositional content of the plan is also intimately involved in the semantics of futurates: it behaves as a conversational background that provides a restriction for a modal quantifier, in the sense of Kratzer (1991), as we will shortly see. This being the case, we have at least a preliminary answer to the second question, how the plan is represented in the semantics. But let us see the evidence that the plan contributes to the modality as I have suggested.⁴

What is a plan? To answer by example, let me tell you about my plan for tomorrow. My plan consists of waking up, showering, having brunch with a few friends, doing some work

⁴Although the analysis I give here is more detailed than others I have seen, I am not the first to say that futurates involve some kind of modality, i.e., quantification over possible futures (Dowty, 1979; Cipria and Roberts, 2001). It is interesting that it is such an uncontroversial position, in light of the fact that in so many languages, futurates seem to have no overt modal morphology. In section 2.2, I will argue that the modals are hiding in plain sight, as it were: the modality actually stems from the modality in progressive and generic aspectual-modal operators.

on this chapter, having a dinner meeting in preparation for the MIT Mystery Hunt, doing the dinner dishes, and going to sleep at a reasonable hour. I am the implied subject of this laundry list of gerunds, so what we have here is a list of propositions. These propositions, being about tomorrow, are evaluated at a time contained in the day after the day I am typing this. More generally, we might say that a plan is a set of propositions, the temporal arguments of which are in the future with respect to the time that the plan is held.

For now I will not venture to say what it is in the world that makes a set of future-oriented propositions a plan, rather than just any old set of future-oriented propositions. Let us suppose, for now, that whatever else makes a plan a plan, it is not manipulated by the grammar. (This supposition will, incidentally, turn out to be incorrect.)

It remains to relate these intuitions about plans to our intuitions about futurate sentences. The time at which the plan is held is the time that we saw can be constrained by tense and high temporal adverbials in futurate. Futurates, then, say of a proposition p , time t , and world w , that at t , in w , p is planned; that is, in all the possible futures that are compatible with the propositions in the plan at t in w , p .

This meaning for futurates is in fact a perfectly ordinary modal semantics, in the sense of Kratzer (1991).⁵ The plan, a set of propositions, is in Kratzer's terminology a *conversational background*, which provides a *modal base*, the set of worlds compatible with those propositions. A modal quantifier (in this case, with universal force) takes the modal base as its restriction. The nuclear scope is the set of worlds on which the proposition is true. Kratzer's account does not use temporal arguments, but from the extensions of her account that do (e.g., Iatridou (2000), Condoravdi (to appear), etc.), we see that even the future orientation of the propositions in the restrictor and nuclear scope is quite unremarkable among modals. Most (though not all) modals have this property.

Let us assume, then, that futurates have a modal operator, called PLAN, which says that at a certain time there exists a plan (a set of future-oriented propositions), and says that p , the propositional argument, is true on all the futures that are compatible with the plan.

⁵See chapter 1 for a summary of Kratzer (1991).

- (19) $\text{PLAN}(p)(w)(t) = 1$ iff at t there exists a plan (a set of propositions, future-oriented with respect to t) such that in all worlds w' compatible with the plan:
 $[\exists t' > t: [p(w)(t')]]$

The modal character of futurates is clearly evident in certain cases in which a futurate is in the consequent of a conditional. The fact is that some such conditionals seem to have the *if* clause restricting the futurate modal. Consider the conditional in (20).

- (20) If the weather is good tomorrow morning, Joe is leaving tomorrow at noon.

What this sentence conveys is that there is a plan roughly as follows: if the weather is good tomorrow morning, Joe leaves tomorrow at noon. That is, in all the worlds compatible with the propositions in the plan, and compatible with the proposition expressed by the *if* clause, Joe leaves at noon tomorrow. Note that this reading is different from one in which the *if* clause restricts an epistemic modal, as in the most natural reading of (21):

- (21) If what his mother told me is correct, Joe is leaving tomorrow at noon.

The most natural reading of (21) says that — with a nod, again, to Kratzer — in all the most normal worlds compatible with what the speaker knows, and in which the proposition expressed by Joe’s mother is true, then there is a plan for Joe to leave tomorrow at noon. On this reading, the *if* clause restricts a null epistemic universal modal,⁶ where the modal base is provided by the speaker’s knowledge.⁷ The sentences in (20) and (21) thus tell us that, in principle, when there is a futurate in the consequent of a conditional, there is a universal modal with a modal base grounded in a plan, that can be restricted by the *if* clause. That is, the part of futurate meaning that has to do with plans behaves exactly as we expect a modal to behave.

We now have a hypothesis for the meaning of futurates: Namely, that they assert that there is a plan at t for p to happen at some later time.⁸ This hypothesis fits well with our

⁶An epistemic reading is not possible with an unplannable, future-oriented eventuality in the antecedent, as in (20), for reasons which will be discussed in chapter 4.

⁷There is another reading in which the *if* clause in (21) restricts the futurate modal instead, as in the example we investigated in (20). On the futurate-restricting reading of (21), Joe’s plan depends on whether his mother said to the speaker something true or not. In the worlds in which she said something true, which are also compatible with his plan, he leaves tomorrow at noon.

⁸Where I speak of plans for a proposition to happen, I mean, of course, plans for an eventuality of the kind described by the proposition to happen.

observations up to this point. However, this analysis fails to account for certain other facts.

2.1.2 Disadvantages of this approach

There are two problems for the PLAN hypothesis as it stands so far. The first is a problem with the proposed assertion of futurates, and the second problem is the absence, in the hypothesis, of a presupposition which appears to be present in futurates.

2.1.2.1 A problem with the assertion

If futurates really just assert that there is a plan for the eventuality to occur, we would expect futurates to have the same entailments as do sentences that explicitly state that there is a plan for the eventuality to occur. However, this is not the case, as shown in (22). The examples in (22a) are contradictions, while the examples in (22b) are not.

- (22) a. # The Red Sox play the Yankees tomorrow, but they won't/might not.
b. There is a plan for the Red Sox to play the Yankees tomorrow, but they won't/might not.

If the assertion of the futurate in (22a) really is just that the plan exists, it is not clear why spelling it out that there is a plan, as in (22b), should be any different. Yet the futurate shows a conflict with denying that the eventuality will happen, while the explicit assertion that there is a plan does not. The PLAN hypothesis cannot account for this difference.

2.1.2.2 The need for a presupposition

The second problem has to do with presuppositions.

If the assertion is, as we said above, that there is a plan for the eventuality to happen, then the example in (23a), below, is predicted to have a different meaning from the meaning it actually has. (23a) is predicted to mean the same as (23b). But if it means that, then by analogy, (24a) would be expected to mean the same as (24b).

- (23) a. I doubt that the Red Sox are playing the Yankees tomorrow.
b. I doubt that there is a plan for the Red Sox to play the Yankees tomorrow.

- (24) a. # I doubt that it's raining tomorrow.
 b. I doubt that there is a plan for it to rain tomorrow.

While (24b) is felicitous, however, (24a) is odd. This fact cannot be explained if (24a) is supposed to have the same meaning as (24b).

Here is another side to this problem, which engenders yet another problem. Suppose that Major League Baseball has not yet decided who plays whom tomorrow. Then clearly, neither (25a) nor (25b) is true.

- (25) a. The Red Sox play the Yankees tomorrow.
 b. The Red Sox don't play the Yankees tomorrow.

This behavior is in opposition to the behavior of (for example) universal quantifiers. The negation of the universally quantified sentence in (26a), given in (26b), is true in a case where some semanticists smoke and some do not smoke. Either (26a) is true, or (26b) is true.

- (26) a. All semanticists smoke.
 b. Not all semanticists smoke.

What we have here is a case of the classical Principle of the Excluded Middle (PEM). The PEM holds when it is the case that either p is true or not-p is true; there is no case where neither the proposition nor its negation is true (e.g., Horn (1989), von Stechow (1997); also Thomason (1970) for a future-oriented version of the PEM). Universally quantificational sentences such as those in (26) do not obey the PEM, since they allow cases in which some semanticists smoke and some do not. Futurates such as those in (25) do obey the PEM, since they forbid cases in which on some worlds compatible with the plan, the teams play tomorrow, and on others, they do not play tomorrow.⁹

⁹It may just be possible to get a negated futurate to sound true in one of the middle cases. Suppose that it is not yet decided whether MLB is committed to the Red Sox playing the Yankees tomorrow. Then (i) may be construed as true:

(i) It is not the case that the Red Sox play the Yankees tomorrow.

Maybe (25b) can be construed as true as well in this situation. I share von Stechow's intuition, contra Horn, that if these sentences are true in such a case, they involve metalinguistic (very high) negation (Horn, 1989). Thus they are not of concern to us here, for a reason to be discussed just below.

The proposal under discussion cannot account for the PEM in futurates as long as the negation has scope over PLAN, because then a negated futurate is predicted to mean that there is not a plan for p. Not only does this meaning fail to exclude the middle (since it would be true in cases where there is no particular plan for p), but it also, again, predicts that it should be fine to say (27):

(27) # It's not raining tomorrow.

It could be, of course, that the negation instead has scope under PLAN in negated futurates. In that case a negated futurate would mean that there is a plan for p not to happen; the middle case where there is no particular plan about p is excluded as desired. However, this option is not very satisfying. As we have already seen, we need to solve the same problem that the sentence in (27) has, even in cases when negation is in a higher clause and thus has to have scope over PLAN, as in (24a). It makes sense to rule out these cases together. Therefore, we may conclude that we still need a presuppositional answer to why (24a) and (27a) are bad; a scopal answer will not do, even though it would also solve the problem with the PEM. We will have to account for the PEM in some other way.

2.1.3 Argument for a smarter grammar

What went wrong with the proposed meaning for futurates? Consider the problematic examples again.

- (28) a. # The Red Sox are playing the Yankees tomorrow but they might not.
b. # I doubt that it's raining tomorrow.

The first problem, the unacceptability of (28a), seems to indicate that the speaker of a futurate has some high level of confidence that the future eventuality will happen. The second problem is that (28b) appears to have a presupposition that the eventuality be of a kind that could, in principle, be planned.¹⁰

¹⁰Given that the embedded futurate must be responsible for this presupposition, matrix futurates would also have such a presupposition, making presupposition failure the reason why *It rains tomorrow* is odd — a reasonable proposal.

What I would like to point out about these problems is that, in order to account for either one of these, our semantics will need to know something more about plans than that merely they are sets of future-oriented propositions. This is clearest in the case of the second problem; the grammar apparently cares whether or not the proposition is something that *could* be planned. Some propositions can be planned, it seems, and some can't, and this is relevant to the grammar. Since any future-oriented proposition trivially *could* be included in a set of future-oriented propositions, the grammar must have a more restrictive definition of what it is to be a plan.

This issue is also lurking in the first problem, a bit deeper. Suppose that we try to clarify the idea that the utterance of a futurate somehow commits the speaker to expressing faith that the planned eventuality will happen. The question that immediately arises is whether this speaker confidence is part of the assertion, or is a presupposition.

The confidence seems, on the one hand, not to be part of the assertion. To see this, consider once more the example in (23a), repeated here as (29).

(29) I doubt that the Red Sox are playing the Yankees tomorrow.

What the speaker is in doubt about in (29b) is definitely not whether the game will happen or not, but whether the game is planned to happen or not. (This fact is in line with our initial hypothesis that the assertion is an assertion about the plan.) We may conclude that any confidence on the part of the speaker about whether the game will happen or not is not part of the assertion.

Suppose, then, that the confidence is a presupposition; that the speaker of a futurate presupposes that the eventuality will actually happen. But this too does not seem right, as Vetter (1973) argues. If there were such a presupposition, the sentence in (28b) would deny its own presupposition, because the presupposition of the embedded clause would also be a presupposition of the matrix. Consider (30), for example:

(30) I doubt if John has quit smoking.

The matrix clause, like the embedded clause, presupposes that John smoked at one time; this property is a general property of attitude sentences (Karttunen, 1974; Heim, 1992). Vetter argues that the same kind of presupposition projection is at work in (23a), so that

the speaker would doubt whether the Red Sox would play, but presuppose that the speaker was sure that they would play. Therefore, following Vetter, I conclude that a presupposition of speaker confidence is not the correct presupposition for futurates.

The appropriate presupposition, rather, seems to be a conditional one: the speaker is certain that *if* the plan says the Red Sox play the Yankees tomorrow, they will. This can be both a presupposition of the embedded clause and the matrix clause without contradiction, and it would yield the correct judgments. A conditional presupposition also seems right for futurate questions, as in (31), where we certainly would not want the speaker to be presupposing that the Red Sox are playing the Yankees tomorrow.

(31) Are the Red Sox playing the Yankees tomorrow?

So a conditional presupposition, to the effect that if *p* is planned, *p* will happen, seems plausible as a candidate for the source of the speaker confidence.

(32) *Conditional presupposition:* If *p* is planned, *p* will happen.

But if that is so, again the grammar must know more about the plan than we have so far been willing to tell it. If a plan is just a set of future-oriented propositions, then futurates should be able to vary as to whether their plans consist only of propositions describing eventualities that will actually turn out to happen, or only of those that will not turn out to happen, or a combination of both. Thus there should be no conditional presupposition, and no PEM. But this conclusion contradicts the observed data. Therefore, once again, the semantics must be using a different, more restrictive definition of a plan than merely an arbitrary set of future-oriented propositions.

We will want to know what principles govern this conditional presupposition of futurates. Let us first consider our intuitions about plans. Then we can see which of those are relevant to the computation of presuppositions in futurates.

2.1.4 Intuitions about plans

If we consider what we know about plans aside from their being sets of future-oriented propositions, we might come up with the following two initial intuitions:

1. *A plan is made by an animate entity that has a desire to see that the plan is realized.*
2. *The entity has the ability to see that the plan is realized.*

I take these intuitions, without argument, to be a reasonably good starting point. Unpacking them will allow us to find out which of their parts are of interest to us, in our quest to determine the meaning of futurates.

2.1.4.1 On being committed

The first naive intuition on the list is that the person making the plan for p must somehow want p to happen. However, an entity can have a plan and intend to carry it out, seemingly without actually wanting to, as in (33).

(33) I'm doing laundry tomorrow, even though I don't want to.

Is there a problem, then, with the naive intuition?

I think we can safely say that there is no real problem, on the strength of Kratzer's discussion of a parallel issue (Kratzer, 1991). Here is a version of Kratzer's point. Suppose that I only have enough clean clothes to make it through tomorrow. Suppose also that the propositions in (34) are true.

- (34)
- a. I want to have clean clothes.
 - b. I don't want (= want not) to do my laundry.
 - c. I don't want to (= want to not) have someone else do my laundry.
 - d. I don't want to (= want to not) buy new clothes.

Assuming that the only ways I am going to get clean clothing are by washing my clothes myself, having someone else do it for me, or buying something new to wear, then there is no world in which all of the desires expressed in (34) are true, because taken together they are contradictory. And yet the desires in (34) are perfectly natural simultaneous desires.

The introduction of *gradable modality* into the modal framework allows us to model contradictory desires such as those in (34). The idea is that my desires in (34) — and desires in general — do not all have equal weight. In the present instance, suppose that above all else I would like to avoid buying new clothes. Next most important to me is to

avoid having someone else do my laundry. Having clean clothes is my next priority, and avoiding doing the laundry myself is least important. In such a scenario, it is obvious that my best course of action is to resign myself to doing my laundry. Thus the utterance in (35) expresses a true proposition.

(35) I should do laundry tomorrow, even though I don't want to.

Now we alter the theory of modals to get (35) to turn out true. In Kratzer's terminology, the conversational background consisting of the propositions expressed in (34) provides an *ordering source* on the accessible worlds being quantified over. The ordering source partitions the worlds into sets, and ranks them according to how well they agree with the conversational background. In our case, for instance, worlds in which I do my own laundry are the best possible worlds; worlds in which I buy new clothes so I can have something to wear tomorrow are the worst.

The modal *should* is approximated by universal quantification over not the set of accessible worlds, but the set of best accessible worlds. On all those worlds, I do my laundry. Thus the reason that (35) comes out true is not that my desires are not involved in the evaluation of the *should* clause, but that *should* takes into account all of my (graded) desires, while *want* does not.

If the conversational background in (34) provides the ordering source, what provides the modal base? I will assume that the modal base consists of all the worlds that agree with the actual world up to the present; i.e., the metaphysically accessible worlds. We do not want to throw in metaphysically inaccessible, yet eminently desirable worlds, such as those where my fairy godmother comes down and zaps my laundry clean. If they were included, it would not be true that I should do my laundry. I could just wait for my fairy godmother.

This mechanism works equally well to explain why (33) is true, not contradictory. We might therefore revise the statement of the intuition to say that the following is true of an entity making a plan for p: p is true in all the worlds that are optimal according to an ordering source given by the entity's desires. Let's abbreviate this state of affairs as the following: p is true on all the worlds consistent with the entity's *commitments*.¹¹

¹¹The terminology was suggested to me by Noam Chomsky (p.c.). The word *intentions* would also be an appropriate translation, but I prefer *commitments* for reasons which will surface in section 2.1.7 below.

2.1.4.2 Ability

The second intuition about plans was that the entity making the plan, if it is a valid plan, has the ability to see that the plan is realized.

To demonstrate the role of this claim, suppose that my four-year-old cousin Max utters the sentence in (36a) and his mother Chelsea says the sentence in (36b).

- (36) a. We're seeing Spiderman tomorrow.
b. We are not seeing Spiderman tomorrow.

Max is clearly mistaken in uttering (36a). What is not clear from what I have told you is which of two mistakes he is making. He could be making a mistake about his mother's commitments, still accepting that she is the one with the ability to determine which movie the family will see. In that case, he will probably correct his belief upon hearing what his mother has to say on the subject.

On the other hand, being a four-year-old, he could equally be under the misapprehension that he has the authority to make plans for the family. On that scenario, he wants to see Spiderman (that is, he is committed to it), and believes that he has the ability to make that happen, so that his mother's comment may well not change his belief.

But it is Chelsea and not Max, of course, who really has the ability to say what the family does. For a certain class of eventualities, if she wants an eventuality to happen, it happens. And equally, if she doesn't want an eventuality to happen, it doesn't happen. What Mom says, goes.

That at least is the assumption. Readers who are themselves parents of four-year-olds can easily come up with counterexamples. Chelsea may, for example, utter the sentence in (37), but if there are flash floods and they cannot get to the theatre the next day, what she ordained did not happen.

- (37) We're seeing Scooby Doo tomorrow.

This kind of thing happens now and then. It does not shake our belief in Chelsea's authority as a mother if there happens to be a flash flood just as they start out for the movie theatre. We still want to presuppose that what Mom and Dad say about certain events, goes.¹²

¹²What if Mom and Dad disagree? If they are really sharing control they probably won't talk about the

How can we reconcile our intuition that Chelsea has the ability to make valid plans about the family seeing Scooby Doo, with the example where she plans it but it doesn't end up happening? Here we might again use an ordering source, this time picking out something like the most normal worlds. The worlds in which there are flash floods or some other act of God that prevents the family from getting to the theatre are certainly not the most normal worlds. Let us suppose (following Bhatt (2000) and Hackl (1998)) that ability involves universal quantification, on the grounds that if you have the ability to do something, you do it *whenever* the circumstances are right, you want to, and so on. Using a normality ordering source with a universal quantifier yields universal quantification over the set of most normal worlds; this is more or less what is needed here.

Now, having minimally fleshed out these intuitive notions about planning — the desire/commitment of an entity, and the ability of an entity, modulo acts of God, to ensure that the plan is realized — we can return to try and solve the problems with our initial hypothesis for futurate meaning. I argued above that these problems stemmed from an overly simplistic representation of plans in the semantics. At this stage, the question to be asked is whether any appropriately more complicated representation now suggests itself.

2.1.5 A solution

Recall once more the examples that were problematic for our initial hypothesis for futurate meaning:

- (38) a. # The Red Sox are playing the Yankees tomorrow but they might not.
 b. # I doubt that it's raining tomorrow.

The example in (38a) was mysteriously contradictory, and our semantics for the example in (38b) appeared to be lacking a presupposition to cause the observed presupposition failure. I attributed these problems to an inadequate representation in the grammar of plans. I showed this in part by showing that the example in (38a) indicated that something like the conditional in (39) was needed as a presupposition, to account for the contradictory nature

possible options using futurates. The reader can verify this by trying some futurates on his or her significant other.

of (38a). Supposing that we do not simply stipulate the conditional presupposition, then plans cannot be just any set of future-oriented propositions. If they were, the conditional presupposition would not be true.

(39) *Conditional presupposition:* If p is planned, p will happen.

(39), of course, could be stipulated, but we wanted to know whether it followed from some more basic property of plans, hinging on their representation in the grammar.

2.1.5.1 Formal beginnings

The intuitions fleshed out above regarding the entities behind the plans will prove to be of use in augmenting our representation of plans to account for (38a) and (38b).

Before we start, let us agree to call the entity who makes a plan a *director*. As we have seen, the director need not be the subject of the sentence; for now let's suppose that a director is supplied contextually. Directors must be animate; they may also be plural individuals (e.g., Major League Baseball and my parents both qualify as possible directors).

A director for a proposition p, as we concluded above, has at least two properties: the ability to ensure that p happens, and the commitment to seeing that it does happen. I would like to propose that, in futurates, the former property is attributed to the director in a presupposition, and that the latter property is attributed to the director in the assertion, as stated informally in (40).

- (40) a. Presupposition: The director has the ability to ensure that p happens
b. Assertion: The director is committed to p happening

In effect, this presupposition is a restatement of what I called the conditional presupposition, in (39). Now let us see how this proposal solves the problems.

The reason (38a) is a contradiction, on this proposal, is that the second conjunct contradicts an entailment of the first conjunct. The utterer of *The Red Sox are playing the Yankees tomorrow* presupposes that the plan for them to do so is made by someone who has the ability to see that such a plan is carried out (Major League Baseball, in this case). Combined with the assertion that there is such a plan, it is entailed that the plan will come

to fruition. Thus it feels like a contradiction for the speaker to continue on to assert that it might not.

Furthermore, with the proposed presupposition in (40b), the problem with (38b) can also be accounted for. For if it is presupposed that the entity making the plan has the ability to see that the eventuality is carried out, presupposition failure will rule out utterances such as *I doubt that it is raining tomorrow*, cases where there could not possibly be such a plan. This is as desired.

At this point we have a hypothesis about both the assertion and presupposition of futurates. To formalize it, let us define *d directs p in w at t* to capture the notion of the ability to make a valid plan, for use in presuppositions of futurates. This ability is the ability to ensure that, if *d* is committed to *p*'s happening, *d* will happen. (Note that this formulation is quite similar to the conditional presupposition above.) The antecedent includes all cases where *p* is true on all the worlds in which *d*'s commitments are satisfied; we discussed this earlier. The consequent, however, we have not discussed. How to express what will actually turn out to happen is not clear (in fact, we will spend a great deal of time mulling over this question in chapter 3). It could be a metaphysical modal base with an empty ordering source, or a single future. We do not have any way to decide between these alternatives here, so I will just use the former option.

Here is a first try at a definition of direction:

(41) *A first try at direction.*

An entity *d* *directs* a proposition *p* in *w* at *t* iff:

$\forall w'$ metaphysically accessible from *w* at *t* and consistent with

d's commitments in *w* at *t*:

$[\forall w''$ metaphysically accessible from *w* at *t*:

$[\exists t' > t: [p(w')(t')] \Rightarrow [\exists t'': > t: [p(w'')(t'')]]]]]$

What this definition does is to take a set of worlds and say that there is a subset of that set, such that all the worlds in the subset agree with all the worlds in the larger set on a certain property.¹³ The larger set is the entire set of metaphysically possible worlds,

¹³The double restriction to metaphysically accessible worlds is not redundant. Suppose, for instance, that

while the subset is the set of worlds consistent with the director's commitments (but still metaphysically accessible). The property is the property of there being some future time at which p is true on the world in question. Thus, whether the director's commitment-worlds have the property determines whether the entire set of metaphysically possible worlds has that property or not. That is, what the director says, goes (or at least, is presupposed to go).

The presupposition of futurates is then simply the presupposition in (42):

(42) *Direction presupposition:* d directs p in w at t

The assertion is, still, that the future-oriented proposition p is consistent with d 's commitments (maximally consistent with d 's desires) in w at t .

(43) *Assertion of futurates:* d is committed to p in w at t

Thus the revised denotation of the futurate operator PLAN is:

(44) $\llbracket \text{PLAN} \rrbracket^g(d)(p)(w)(t)$ is defined iff d directs p in w at t . If defined, $\llbracket \text{PLAN} \rrbracket^g(d)(p)(w)(t) = q$ iff d is committed to p in w at t .

So far, not so bad. But there is a problem with the definition of direction.

According to the definition, an entity d has to have the following property in order to direct p : If d is committed to p , p will happen. But d need not have the following property: If d is committed to p not happening, p will not happen. Suppose further that p is the proposition expressed by *The Red Sox play the Yankees tomorrow*, and that Major League Baseball is committed to the non-occurrence of (an eventuality described by) p . Then it could be that p will happen. But in that case, the familiar-looking sentence in (45) should be true.

(45) # The Red Sox don't play the Yankees tomorrow, but they might.

The sentence in (45) is infelicitous, I presume, due to presupposition failure: if some metaphysically accessible worlds are Red-Sox-play-Yankees worlds and some are not, then some-

d wants p and also wants not- p , and only p is metaphysically possible. If we were considering all of d 's desire-worlds, d would not have an opinion about p . But intuitively, d does have an opinion about p in such a case.

thing goes wrong. If we exclude such cases in the definition of direction by using a biconditional instead of a one-way conditional, we can exclude examples like (45).

(46) *A second try at direction.*

An entity *d* *directs* a proposition *p* in *w* at *t* iff:

$\forall w'$ metaphysically accessible from *w* at *t* and consistent

with *d*'s commitments in *w* at *t*:

$[\forall w''$ metaphysically accessible from *w* at *t*:

$[\exists t' > t: [p(w')(t')] \Leftrightarrow [\exists t'': > t: [p(w'')(t'')]]]]]$

The example in (45) highlights an interesting consequence of this revised definition of direction: either all the metaphysically accessible futures are *p*-worlds, or none are. For suppose, for reductio, that there are both *p* and not-*p* worlds among *d*'s commitment-worlds (the subset). Consider a *p* world in the subset. Then by (41), all worlds in the larger set (including those in the subset) are *p* worlds, contradicting our assumption that there exists a not-*p* world in a subset of the larger set. There can therefore be no not-*p* worlds anywhere in the larger set. (If you switch “*p*” and “not-*p*,” of course, you get the same result.)

The states of affairs permitted by the definition, in other words, obeys the Principle of the Excluded Middle. The definition guarantees that either *p* is true on all the metaphysically accessible worlds, or not-*p* is true on all the metaphysically accessible worlds; excluded is a situation in which *p* is true on some worlds and not-*p* is true on others. Thus either a futurate is true, in which case all the metaphysically accessible worlds are *p*-worlds; or its negation is true, in which case all the metaphysically accessible worlds are not-*p* worlds; but there is no case in which some of the metaphysically accessible worlds are *p*-worlds and some are not-*p* worlds. This is good; we saw earlier that the middle is excluded in futurates, since cases in which the relevant plan says nothing about whether the two teams play tomorrow are true for neither (47a) nor (47b).

- (47) a. The Red Sox are playing the Yankees tomorrow.
 b. The Red Sox aren't playing the Yankees tomorrow.

I have now redeemed my earlier promissory note that the PEM would be dealt with. Before moving on to some other consequences of this denotation of futurates, I would like to first

discuss two issues having to do with the definition of direction (the second of which will prompt us to alter the definition again).

2.1.5.2 Scopal relations in the definition of direction

Firstly, the reader may be wondering how the scopal relations in the definition of direction were determined. While the relative scope of the universals is not significant, the scope of the existential temporal operators with respect to the universal quantifiers and the biconditional operator is important. For suppose that instead, the existential quantification over times took higher scope than the universal quantification over worlds, as in (48).

(48) *An overly strong definition of direction.*

An entity d *directs* a proposition p in w at t iff:

$[\exists t' > t: [\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t :

$[\forall w''$ metaphysically accessible from w at t :

$[p(w')(t')] \Leftrightarrow [p(w'')(t')]]]]]$

This definition says that there is a time t such that all the metaphysically accessible worlds agree that either p is true at t or that it is not the case that p is true at t . This requirement is too strong (p.c. Kai von Fintel). The reason is that a director may be committed to having something happen at an unspecified future time. I have a plan that sometime this evening I will eat dinner. But this plan is consistent with worlds in which I eat dinner at 6, worlds at which I eat dinner at 6:01, and so on. If the definition in (48) were the correct one, such a state of affairs would be ruled out. The same problem, incidentally, afflicts a version of the definition in which the the existential quantification has scope between the universal quantifiers and the biconditional:

(49) *Another overly strong definition of direction.*

An entity d *directs* a proposition p in w at t iff:

$\forall w'$ metaphysically accessible from w at t and consistent with

d 's commitments in w at t :

$[\forall w''$ metaphysically accessible from w at t :

$[\exists t' > t: [[p(w')(t')] \Leftrightarrow [p(w'')(t')]]]]$

So the low existential quantifiers in (41) are really what we want.

2.1.5.3 Ability and accidental directors

There is a real problem, however, with the proposed definition of direction.¹⁴ The problem is that so far we have not captured the intuition, discussed above, that the director must have the ability to see that p happens or doesn't happen.

Imagine that there is an entity d who is the director of a certain proposition, in having the ability to see that his or her commitments with respect to p are realized. Imagine too that there is a second entity d' whose commitments happen to correspond to the commitments of the director, but who has no ability to see that those commitments are realized. According to our current definition of direction, d' would count as a director for p . This undesired result stems from the fact that we have not yet formally distinguished between d 's and d' 's abilities.

Ability is, needless to say, a thorny topic (Bhatt, 2000; Hackl, 1998; Kratzer, 1991), and I will not attempt to deal with it properly here (though cf. Copley (in progress) for such an attempt). But quite roughly, if an entity has an ability to carry out p , then the entity has properties such that in more or less every situation, real or counterfactual, in which the entity wants p , the entity carries out p . The *more or less* stands in for a real theory of how to restrict the universal modal; counterfactual modality, I assume, uses a normal ordering source such that the worlds in which the entity does not have the relevant properties are not considered. So for example, if it is true that Zoe is able to swim, then there Zoe has properties that entail that in more or less every situation, real or counterfactual, in which she feels like swimming (and there is water, and it is not too wavy, etc.), she swims.

¹⁴This issue was originally pointed out to me by Irene Heim (p.c.).

I do not want to delve too deeply into the mysteries of ability and counterfactuality here, but at the same time, I would like to revise the definition of direction to reflect these considerations. As an admittedly incomplete solution, I will insert a reference to the modality of ability into the definition, with its meaning understood to be left unformalized. Thus:

(50) *A third try at direction.*

An entity *d* *directs* a proposition *p* in *w* at *t* iff:

$\forall w'$, *d* has the same abilities in *w'* as in *w*:

$[\forall w''$ metaphysically accessible from *w'* at *t* and consistent with *d*'s commitments in *w'* at *t*:

$[\forall w'''$ metaphysically accessible from *w* at *t*:

$[\exists t' > t: [p(w'')(t')] \Leftrightarrow [\exists t'': > t: [p(w''')(t'')]]]]]$

Having come to a definition of direction that appears adequate, we are ready to propose a denotation for (progressive) futurates. Suppose we retire the term “PLAN” and create a function ALL_b that is responsible for the universally quantified, bouletically ordered modal meaning of progressive futurates. Then ALL_b should look like the following:

(51) *A first try at progressive futurates.*

$ALL_b(d)(q)(w)(t)$ is defined iff *d* directs *q* in *w* at *t*.

If defined, $ALL_b(d)(q)(w)(t) = 1$ iff $\forall w'$ metaphysically accessible from *w* at *t* and consistent with *d*'s commitments in *w* at *t*:

$[\exists t' > t: [q(w')(t')]]$

This denotation accounts for the facts observed above.

2.1.6 Simple futurates

So far we have considered only progressive futurates. Simple futurates (those that use the simple form of the verb, which has no morphology aside from agreement) are very like progressive futurates in certain respects. For example, the problems that occasioned our search for a new meaning for progressive futurates, are likewise problems with simple futurates, as shown in (52).

- (52) a. # I doubt that it rains tomorrow.
b. # The Red Sox play the Yankees tomorrow, but they won't/might not.

However, there are some intriguing differences between progressive and simple futurates.

One difference can be seen in (53). The progressive futurate question in (53a) clearly asks whether the plan provides for Joe to go skydiving tomorrow. However, the simple futurate question does not ask that. Rather, it presupposes that the plan provides for Joe to go skydiving at some point, and asks whether tomorrow is the day.

- (53) a. Is Joe going skydiving tomorrow?
b. Does Joe go skydiving tomorrow?

The negated futurates in (54) demonstrate the same fact. Unlike (54a), (54b) still commits the speaker to the belief that Joe is going skydiving at some point.

- (54) a. Joe isn't going skydiving tomorrow.
b. Joe doesn't go skydiving tomorrow.

Likewise, a simple futurate is clearly inappropriate in a context in which the content of the plan, not just the time at which it is to be realized, is taken to be new information. Consider a context where the speaker is informing a friend of his marriage plans. While the progressive futurate in (55a) could be used in such a context, the simple futurate in (55b) is impossible. This is presumably because (55b) wrongly takes for granted that there is a plan for the speaker to get married, asserting only that the plan is to be realized in June.

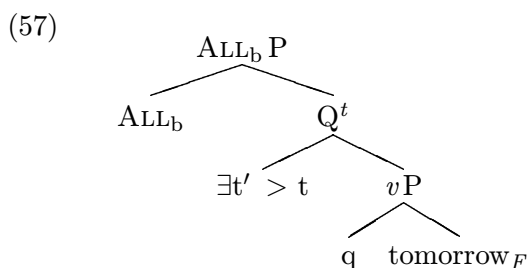
- (55) a. Guess what? We're getting married in June.
b. # Guess what? We get married in June.

Thus the simple futurate cannot have the same semantics as the progressive futurate. The meaning proposed for the progressive futurate in (51) above, repeated here in (56), must be altered for the simple futurate, so that what is asserted in progressive futurates is actually in the presupposition in simple futurates.

- (56) $\text{ALL}_b(d)(q)(w)(t)$ is defined iff d directs q in w at t .
 If defined, $\text{ALL}_b(d)(q)(w)(t) = 1$ iff $\forall w'$ metaphysically accessible
 from w at t and consistent with d 's commitments in w at t :
 $[\exists t' > t: [q(w')(t')]]$

The assertion, as far as we know, could either be that d is committed to p happening at a certain time, or that d will happen at a certain (later) time. Since the latter would be entailed by the former, let us suppose it is the former. How do we write such an assertion? We have so far only spoken of commitments as commitments to propositions, not commitments to propositions with the time argument saturated, i.e., to predicates of worlds. Here it seems we need to have direction apply to predicates of worlds instead. We also need the director to direct both the proposition with the time specified, and the proposition with the time unspecified.

The way to think about this issue, it seems, is in terms of focus alternatives (Rooth, 1995, 1996; von Stechow, 1995). Consider a simple futurate such as *Joe skydives tomorrow*, with a structure as given in (57); normally the temporal adverbial receives a focus accent, denoted by subscript F . The proposition *Joe skydives* is q . Existential closure binds off the temporal argument of q .



The assertion in a simple futurate makes reference to the node I have labelled Q^t , not to q . Q^t is a predicate of worlds that is true at a world w iff there is a t' such that Joe skydives at t' and t' is included in tomorrow, while q is true at a world w and a time t iff Joe skydives in w at t .

Here is a denotation for Q^t in the sentence under consideration:

- (58) $Q^t(w) = 1$ iff $\exists t' > t: [(q)(w)(t') \ \& \ (t') \text{ is included the day after the day which includes } t]$

The presupposition of simple futurates refers neither to q nor to Q^t , but to the union of the focus alternatives to q *Joe skydives tomorrow*_F that are obtained by replacing *tomorrow* with alternatives to *tomorrow*: *Joe skydives the day after tomorrow*, *Joe skydives the day after that*, and so forth. Without going into a detailed account of the mechanics of focus here, let us assume that the set of focus alternatives corresponds to a function F as follows:¹⁵

$$(59) \quad F^t(w) = 1 \text{ iff } \exists t' > t: [(q)(w)(t')]$$

F^t is a function of type $\langle w, t \rangle$, a predicate of worlds as desired.

We revise the definition of direction to take a predicate of worlds rather than a proposition:

$$(60) \quad \textit{A fourth try at direction.}$$

An entity d *directs* a predicate of worlds P in w at t iff:

$\forall w'$, d has the same abilities in w' as in w :

$[\forall w''$ metaphysically accessible from w' at t and consistent with d 's commitments in w' at t :

$[\forall w'''$ metaphysically accessible from w at t :

$[[P(w'')] \Leftrightarrow [[P(w''')]]]]]$

We proceed to a denotation for simple futurates, with Q^t and F^t defined with respect to q as described above:

$$(61) \quad \textit{A first try at simple futurates.}$$

$\text{ALL}_b\text{-simple}(d)(Q^t)(w)(t)$ is defined iff d directs F^t in w at t ,

and $\forall w'$ metaphysically accessible from w at t and consistent

with d 's commitments in w at t : $[F^t(w')]$.

If defined, $\text{ALL}_b\text{-simple}(d)(Q^t)(w)(t) = 1$ iff $[\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t : $[Q^t(w')]]$.

We should make sure that our progressive futurate semantics still works with the new definition for direction. In principle there are two options for the predicate of worlds to

¹⁵I have said nothing in this example about how t' is constrained to be future with respect to t . Here I assume that this can be done by the semantics of direction, since clearly one cannot direct what has already happened. The modal/temporal framework proposed by Werner (to appear), e.g.) could be of use here.

use in the assertion: Q^t and F^t . But we don't want the latter, because then it would be impossible to otherwise specify the run time of q .

At first glance, a definite time seems to be required for the simple futurate, but not for the progressive futurate.

- (62) a. Joe is leaving.
 b. # Joe leaves.

This requirement on the simple futurate can also be satisfied contextually:

- (63) What happens tomorrow? Joe leaves.

The observation in (62) makes it seem as if progressive futurates do not require a temporal specification, so that Q^t is not what we want. On the other hand, (62) describes an achievement, and it is known that progressive achievements are somewhat strange; Rothstein (2001) posits a null event representing the preparation that leads up to the achievement. If she is correct, then we should not think of (62a) as a “real” futurate.

Progressive futurates with other kinds of eventualities do seem to require a temporal specification, be it overt or covert. Without such specification, the progressives in (64) are understood to refer to ongoing eventualities.

- (64) a. Joe is building a house.
 b. Joe is watching TV.

Thus it is appropriate to use the definition of direction in (60) for progressive futurates, and write a new assertion to the effect that d is committed to Q^t :

- (65) *A second try at progressive futurates.*
 $ALL_b(d)(Q^t)(w)(t)$ is defined iff d directs $F^t(q)$ in w at t .
 If defined, $ALL_b2(d)(Q^t)(w)(t) = 1$ iff $[\forall w'$ metaphysically accessible
 from w at t and consistent with d 's commitments in w at t : $[Q^t(w')]]$.

The content of the presupposition is a real difference between simple and progressive futurates and is reflected in the denotations; the need to specify a future time is common to both simple and progressive futurates, despite initial appearances.

Still mysterious is one other difference between simple and progressive futurates. While progressive futurates are possible in the past tense, simple futurates are not, unless in a Sequence of Tense context:

- (66) When does Lowe start next?
- a. Lowe was starting tomorrow against the Yankees.
 - b. # Lowe started tomorrow against the Yankees.
 - c. Jenny said that Lowe started tomorrow against the Yankees.

This difference we will have to set aside for now.

2.1.7 Futurates without directors

There is a final kind of example that should be addressed before we move on to consider how futurate meaning is mapped to the morphosyntax. The fact is that it is possible to have futurates without a director or a plan – this despite the usefulness of directors and plans so far.

The classic example is (67), as in Leech (1971).

- (67) The sun rises tomorrow at 5:13.

Leech finds the progressive in (68) bad; speakers I have consulted differ as to its unacceptability, but in any case, whatever is bad about it is quite subtle, so I will mark it with a question mark. (Note as well that if the progressive and simple do have different judgments here, it is an additional difference between them, not mentioned in the last section.)

- (68) ? The sun is rising tomorrow at 5:13.

For now, though, let's leave the unacceptability of (68) aside while we consider the surprising acceptability of (67). If plans are necessarily only made by animate entities, there is a problem: There is no one who makes a plan for the sun to rise.¹⁶ It would appear that the idea of directors as central to futurate meaning, while promising, is not quite right. The right notion would encompass both the director cases and (67).

¹⁶I am not ready to say that (67) forces us to posit a God in the grammar, though that would certainly get us out of this difficulty.

It would also, like the theory about directors, exclude the unacceptable case in (69) and those like it.

(69) # It rains tomorrow at 5:13.

Previously, we ruled (69) out by virtue of there being no possible director for the rain. But now that we would like to rule in another case that lacks a director, (67), we need a different reason to rule out (69).

Perhaps the difference has to do with the fact that the sun's rising is a regular event in some sense, while the rain is not. But some one-shot events can occur in futurates:¹⁷

(70) The meteorite impacts tomorrow at 5:13am

The difference between (69) and (70) on the one hand, and (67) on the other, seems to have something to do with the fact that the sun's rising and the meteorite's striking at 5:13 are entirely sure things, due to fixed properties of the universe: the laws of gravity, the masses of the sun and the earth.¹⁸ The clockwork motion of the universe, as Newton would have it, determines the movement of the earth around the sun and that is that. The prospect of rain tomorrow at 5:13, however, is much less sure; we know of no lawlike principles true at this moment that entail either that it will happen or that it will not. Howsoever we rule in cases like (67), we must be sure to build this difference into the theory, so as not to erroneously rule in (69).

Suppose we give directorless futurates a meaning as similar as possible to those for other simple futurates. When there is an animate director, d's abilities entail that d's commitments determine whether p. When there is no animate director, let's say, lawlike properties true of the world-time pair in question entail that other lawlike properties of the world-time pair determine whether p.¹⁹ It may thus make a certain amount of sense to speak of the world as a "director."

Of the questions raised by these data, chief among them is the question of whether the alternation between director and no director is a coincidence, or whether it has some

¹⁷The example is due to Sabine Iatridou (p.c.).

¹⁸The particular theory of *which* fixed properties cause the sun to rise or the meteorite to strike at 5:13 is not important; what is important is that there be such properties.

¹⁹Could it instead be just that lawlike about the universe entail that p will happen at some point? Yes; that is entailed by what I have written above.

principled explanation. Through a cross-linguistic study of similar expressions in a number of other languages, we should be able to answer this question. If the alternation between directors and the absence of directors turns out to be involved in many other constructions in different languages, it will be safe to say that the alternation has a principled explanation, and is not just a coincidence. Preliminary evidence indicates that the director alternation is quite widespread.

For example, the abilitative form in Tagalog systematically has both a “managed to do” construal and an “accidentally did” construal, as shown in (71) (Schachter and Otnes, 1972).

- (71) Nakagamit siya ng manggang hilaw.
 use-Abil-Pf 3rd-Top Unm mango-Lnk green
 ‘He managed to use a green mango.’
 ‘He accidentally used a green mango.’

These two construals become easier to understand, I believe, if we think of them as a director alternation. On the ‘managed to do’ construal, the agent of the event is unexpectedly the director; their intentions determined what happened next, although the speaker did not expect them to. On the ‘accidentally did’ construal, the world is unexpectedly the “director;” i.e., unexpectedly, the properties of the world determined what happened next, although the speaker did not expect them to.

Another candidate for a director alternation modal is to be found in Tohono O’odham (an Uto-Aztecan language spoken in southern Arizona). Tohono O’odham has a particle *cem*, that with an eventive predicate means something like ‘tried to do’ or ‘partly did,’ and with a stative predicate means something like ‘was but is no longer’ ((Hale, 1969; Devens, 1972); Albert Alvarez, p.c.).

- (72) a. Huan ‘o cem g pualt kukpio‘k.
 Juan Aux cem Det door open
 ‘Juan tried to open the door.’
 b. Howij ‘o cem suam.
 banana Aux cem yellow
 ‘The banana was yellow (implication: it is no longer yellow).’

I believe that our understanding of *cem* will be greatly furthered by the notion of a director alternation. In (72a), the agent Huan had been committed to opening the door, so if Huan had determined what happened next, he would have succeeded in opening it; but his commitment was in fact unfulfilled. In (72b), perhaps, if the properties of the world determined the future, the state of the banana's being yellow would have continued, but that continuation too was unfulfilled. (We might more accurately speak of the alternation here as one between an animate intender and the world as 'intender,' since in neither case does the intender actually succeed in directing what happens next.)

Thus, it seems that we are justified in proceeding under the assumption that director alternations of the kind found in futurates are no coincidence. From this cursory investigation, it is not clear how we might unify the semantics of a construal that refers to the intentions and abilities of an animate entity with a construal that makes no such reference to an animate entity. Examination of these alternations in several different constructions, in several different languages, will be important in pursuing this unification. For now, having made a start, let us move on.

2.1.8 Summary

In this section, we have elucidated the basic meaning of futurates. Progressive futurates presuppose that there is an entity (the "director") with the ability to determine whether *p*, and assert that the director is committed to *p*. Together these entail that *p* will happen. Simple futurates are similar, but presuppose both of these and assert that *d* is committed to *p* happening at a certain time. Directorless simple futurates are possible, but constrained; we gave a first look at their semantics, and suggested that the alternation between having a director and having no director was a principled one.

At this point I would like to switch gears, in order to ask how these semantics map onto the morphosyntax of progressive and simple futurates. So far the only thing that seems clear about the mapping is that it is not obvious what the mapping is.

2.2 Mapping futurate meaning onto morphosyntax

Because we have to start somewhere, let us start from the supposition that there is a single head associated with the futurate semantics I have argued for above. This supposition immediately raises two questions.

The first question is where the head is located. It turns out that we can rather easily say something about the general region in which it is located; the relevant arguments are given in section 2.2.1.

The second question is whether this hypothetical head is a familiar one (as opposed to a totally new head, null in English). In section 2.2.2, I will follow Dowty (1979) and others in the idea that a progressive operator is responsible for futurate modality in progressives. I strike out into new territory in section 2.2.3 by suggesting that a generic operator is responsible for the futurate modality of simple futurates.

A third question that comes out of the preceding discussion is whether, in cases with animate directors, the director is represented in the syntactic input to the semantics. The alternative would be that all the semantics can see is the set of best worlds, with pragmatics calculating that set from the director's commitments. In section 2.2.4, I will say what I can about this question; there is some evidence suggesting that directors are, in fact, visible to the syntax.

2.2.1 The location of ALL_b

As we begin our investigation into the morphosyntax of futurates, the first question to ask — and the easiest one to answer — is where, roughly, the futurate modal is located.

The temporal input to ALL_b, i.e., the time at which the plan is asserted to hold, is affected by tense. For (73a) to be true, the time of the plan must overlap the present, while for (73b), it must overlap a time in the past.

- (73) a. The Red Sox are playing the Yankees tonight.
b. The Red Sox were playing the Yankees tonight (but they're not any more).

Assuming that there is an existential binder in the denotation of past tense that introduces the temporal argument of ALL_b, ALL_b should be lower than tense.

As for the lower bound, ALL_b seems to be outside of the vP at the very least. The reason is that the agent of the eventuality is included in the content of what the director is committed to. Since by definition (Kratzer, 1996), vP is the projection that introduces the agent, ALL_b must be higher than vP .

Evidence from temporal adverbials confirms this lower bound. Temporal adverbials can appear both clause-initially and clause-finally in futurates. Each position is associated with a particular time: the high adverbial constrains the time at which the plan is asserted to hold, and the low adverbial constrains the time at which the planned event is scheduled to take place. These adverbials cannot be switched (e.g., (74b) cannot be used to express what (74a) expresses).

- (74) a. Yesterday, the Red Sox were playing the Yankees tomorrow.
b. *Tomorrow, the Red Sox were playing the Yankees yesterday.

Assuming unselective binding by temporal adverbials, this means that the plan time is bound higher than the position of the lower adverbial. Where is this lower adverbial? VP-fronting evidence indicates that it is part of the VP (that is, the vP):

- (75) VP-fronting
a. Mary said the Red Sox are playing tonight, and [playing tonight] they are.
b. *Mary said the Red Sox are playing tonight, and [playing] they are tonight.

Thus we can conclude that the futurate head ALL_b , whatever it is, is located somewhere between tense and the vP . Of course, we would like to know this head's location with greater precision. Even better would be to know its identity.

2.2.2 ALL_b in progressive futurates

We turn now to a long-standing hypothesis that the modality in progressive futurates is contributed by progressive aspect. The progressive has been implicated in the meaning of futurates since at least Dowty (1977, 1979).

I should note, before going on, that such an account would not entail that ongoing and futurate readings of progressives have the same semantics. The futurate could involve an

extra bit of meaning that would interact with a progressive operator PROG in the correct way to yield the plan meaning, e.g. In fact, I will propose such an analysis below; the extra bit is the temporal specification for futurates discussed above. First, however, I would like to compare my denotation of progressive futurates with Dowty's (1979) analysis of progressives (furate and non-furate). I will show that with a minimum of additional assumptions, my denotation can, like Dowty's, perform both functions, while additionally accounting for certain data that Dowty's analysis does not account for.

2.2.2.1 Dowty's modal progressive

Dowty (1979) provides an account of both ongoing and furate readings of progressives, based on a Thomason-style branching future.²⁰ Dowty's progressive operator PROG based on the Bennett and Partee progressive (1971), but set up for branching worlds (although it does not take a world argument because there is only the actual world; any other worlds split off from the actual world at some time in the past). Time branches, in the sense that an interval is not just a length of time but, rather, a part of a world. (That is, it is basically a situation.)

$$(76) \quad \text{PROG}(p)(t) = 1 \text{ iff } \forall w \text{ metaphysically accessible at } t: \text{ there is a } t' \text{ such that } t' \text{ included in } w \text{ and } t \text{ is included in } t', \text{ and } p(t')$$

Temporal adverbials are given a lot to do:

$$(77) \quad \llbracket \textit{tomorrow} \rrbracket^g(p)(t) = 1 \text{ iff: in all worlds containing } t, \text{ for some interval } t' \text{ included in the day following the day that includes } t, p(t'); \text{ and the truth of } p \text{ at } t' \text{ is planned or predetermined by facts or events true at some time } t'' \leq t$$

The composition of Dowty's progressive furate is as follows:

$$(78) \quad \textit{Dowty's progressive furate.} \\ \text{PROG}(\llbracket \textit{tomorrow} \rrbracket^g(p))(t)$$

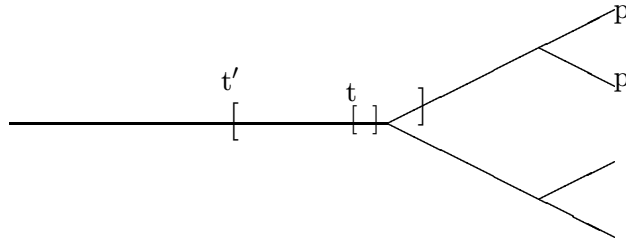
Thus a progressive furate, assumed to have a future-oriented adverbial such as *tomorrow* (even if covert), means the following:

²⁰See chapter 1 for a brief introduction to Thomason's future.

- (79) $\text{PROG}(\llbracket\text{tomorrow}\rrbracket^g(p))(t) = 1$ iff $\forall w$ metaphysically accessible at t : there is a t' such that t' is included in w and t is included in t' and in all worlds containing t' , for some interval t'' included in the day following the day that includes t , $p(t'')$; and the truth of p at t'' is planned or predetermined by facts or events true at some time $t''' \leq t'$

Here is a graphical representation. The branching worlds are all *inertia worlds*; i.e., worlds which continue as current facts allow:

- (80) A case in which Dowty's progressive futurate is true



Reviewing the benefits and drawbacks of this analysis, we see that although it could account for the fact that futurates have two temporal arguments, it does not have them in the right syntactic configuration, since *tomorrow* has scope under PROG.²¹

Furthermore, the account correctly puts the plan in the assertion, but the facts we saw above, about the presuppositions of futurates, are not addressed.²² If we consider the futurate presupposition more closely, we may note that the interval t' is situation-like, in only occurring on some of the metaphysically possible worlds. For Dowty, then, the progressive futurate is true in a case in which p only happens on some of the futures. For Dowty this is an explanation of the judgment that progressive futurates reflect a lesser degree of certainty than does *will* (he assumes *will* to be essentially Thomason's future).

However, this judgment conflicts with what we saw above, that speaker confidence that the eventuality will occur is entailed by progressive futurates. We needed to say that because

²¹Unless the plan time introduced by *tomorrow* were to be bound by a higher operator.

²²This second shortcoming is shared by Cipria and Roberts (2001).

of the contradiction in (81):

(81) # The Red Sox are playing the Yankees tomorrow, but they might not.

The situation-like interval which only occurs on some futures is of no help in capturing that fact; (81) should come out acceptable and true on Dowty's account.

Can we create a modal analysis of the progressive that would help us account for such facts? We saw that the certainty alluded to above came from belief in the ability of the person who made the plan. Dowty does discuss people who make plans:

“When a person makes a decision to do something at a future time and then does it as he intended, two things are involved: the initial decision to perform the action at a later date, and moreover, a failure to change his mind between the time he makes the decision and the time he carries it out. If the person changes his mind and is not otherwise bound to carry out the action, then his decision did not really predetermine the event. If a person has made such a decision, then clearly, in all the inertia histories containing the time of the decision, he carried it out. The inertia worlds for a time t should quite clearly be worlds in which nobody changes his mind after t .”

So for Dowty, an example like (82) ends up saying that in all inertia worlds from t , I leave tomorrow. The actual world wasn't an inertial one, but that is fine; it need not be.

(82) I was leaving tomorrow, but I changed my mind.

But the real thing missing from Dowty's framework is what it means to be confident that something planned will be realized. This comes up in two places.

Consider again my cousin Max. I have said that if his mother says *We're seeing Scooby Doo tomorrow*, then on all the worlds that are both inertially normal and maximally compatible with her commitments, they see Scooby Doo. But instead suppose we tried quantifying over just the inertially normal worlds, worlds in which no one changes their mind. But in that case, we are restricted to worlds in which (for example) Max doesn't change his mind, and that seems too restrictive.

Furthermore, as we saw, faith in the ability of the person making the plan was crucial to explaining why we can't say both that the Red Sox are playing the Yankees tomorrow and that they might not, without contradicting ourselves. If both the progressive and *might* quantify over the same set of inertia worlds, there should be no contradiction.

I will treat the notion of inertia as the ordering source for modals used when there is no animate director whose commitments would provide a bouletic ordering source. The facts

about the world that are inclined to remain true, all else being equal, are what provides the inertial ordering. (As I have mentioned, it seems as though these notions should be unified, though I will not do it here.)

If we need both inertial and bouletic ordering sources for futurates, and if we are going to try to attribute this modal meaning to the progressive, we should ask whether non-futurate readings (ongoing readings) of progressives also have both inertial and bouletic ordering sources.

2.2.2.2 Ongoing readings of the progressive

Dowty and others (Landman (1992); Portner (1998), etc.) treat the progressive as quantifying over inertia worlds. Ongoing progressives are generally felicitous even when there is no individual who could possibly direct the proposition, as in (83).

(83) It's raining.

This can be true even when there is a possible director that is contextually available. Suppose that Jenny wants to draw a circle and starts drawing. The sentence in (84a) can mean that Jenny thinks she is a director for an ongoing drawing-of-a-circle eventuality, but she isn't actually a director; that is, what she says doesn't necessarily go. In the same context, we could utter (84b), and it could be true, even though Jenny doesn't want to draw an oval. In fact, no one need want it.

- (84) a. Jenny thinks she is drawing a circle.
b. She is actually drawing an oval.

This is exactly the kind of problem for which inertia orderings were invented. Is there any need for a bouletic ordering as well? Possibly, but with ordinary progressives, it is hard to see what truth-conditional effects there might be if the ordering were bouletic instead of inertial. However, there is a case where a bouletic ordering source might be useful. The progressive statives in (85), from Rothstein (1999), arguably require the subject to be the director.

- (85) a. John is being annoying.

b. # The children are being asleep.

I will not try to explain here why this effect should occur only for statives, but merely note that a bouletic ordering might be useful as an option in this case, so since it is consistent with the progressive data, we might as well consider bouletic ordering to be available to ongoing readings of progressives as well as to futurate readings.

2.2.2.3 A temporal issue

Let us see if we can put together a modal expression that will account for both futurate and non-futurate readings of progressives. As in Dowty’s analysis, in the assertion we want an aspectual element that takes a modal element, if for no other reason than the present -SIP constraint.²³

Here is the current proposal for futurate progressives.

- (86) $ALL_b(d)(Q^t)(w)(t)$ is defined iff d directs $F^t(q)$ in w at t .
 If defined, $ALL_b(d)(Q^t)(w)(t) = 1$ iff $[\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t : $[Q^t(w')]]$.

We use version of the Bennett and Partee (1978) progressive (“SOME_t”) to put on top:

- (87) $SOME_t(p)(w)(t) = q$ iff $\exists t' \supset t: [p(w)(t')]$

The result is as follows.

- (88) *A second try at progressive futurates.*
 $\llbracket SOME_t(\llbracket ALL_b(d)(Q^t) \rrbracket^g)(w)(t) \rrbracket$ is defined iff d directs $F^t(q)$ in w at t .
 If defined, $\llbracket SOME_t(\llbracket ALL_b(d)(Q^t) \rrbracket^g)(w)(t) \rrbracket = 1$ iff
 $\exists t' \supset t: \llbracket ALL_b(d)(Q^{t'})(w)(t') \rrbracket = 1$ iff
 $[\forall w'$ metaphysically accessible from w at t'
 and consistent with d 's commitments in w at t' : $[Q^{t'}(w')]]$

This should still be fine for futurate readings of progressives. But we need to undo some of the work we did earlier to account for ongoing readings. Unlike futurate readings, ongoing readings do not require a future temporal specification; in fact, they forbid it.

²³See chapter 1 for discussion.

For example, if all the progressive in (89) says is that there is some later time of John's watching a movie on the appropriate worlds, there is, incorrectly, no entailment that he is watching it now.

(89) John is watching a movie.

Accomplishments also get the wrong interpretation; what (90) conveys is that in the appropriate worlds, Mary-build-a-house holds over an interval including the present. The denotation in (92), however, says that that Mary-builds-a-house holds over an interval entirely in the future.

(90) Mary is building a house.

Finally, we have what seems to be an extra time in the denotation. Futurates, as I have said, can have two temporal adverbials, one for the time of the plan, and one for the time of the eventuality. Ongoing readings do not have this property.

The solution to these problems is the same: get rid of the temporal specification in the denotation of ALL_b and the definition of direction. Then the higher existential temporal binder in $SOME_t$ (the one that binds the time of the plan in futurates) will bind the time of the eventuality, requiring it to be true of a time overlapping the modal temporal input, as in (91).

(91) *Modal component in ongoing reading of progressives.*

ALL_b -ongoing(d)(q)(w)(t) is defined iff d directs q in w at t.

If defined, ALL_b -ongoing(d)(q)(w)(t) = 1 iff $\forall w'$ metaphysically accessible from w at t and consistent with d's commitments in w at t:

$[q(w')(t)]$

Composition with $SOME_t$ yields the desired denotation for ongoing progressives:

(92) $[[SOME_t([ALL_b$ -ongoing(d)(q)]]^g(w)(t) is defined iff d directs q in w at t.

If defined, $[[SOME_t([ALL_b$ (d)(q)]]^g(w)(t)

= 1 iff $\exists t' \supset t$: $[ALL_b$ -ongoing(d)(q)(w)(t')]

= 1 iff $[\forall w'$ metaphysically accessible

from w at t' and consistent with d's commitments in w at t': $[q(w')(t')]$]

So it seems that we can use very similar, though not identical, semantics for both ongoing and futurate readings of progressives.

Of course, as we have seen, there are futurates that do not have progressive morphology. Therefore, the idea that the progressive operator is what contributes futurate meaning to progressive futurates stands or falls depending on whether we can convince ourselves that there is a different operator to do something similar for simple futurates.

2.2.3 ALL-b in simple futurates

Here I would like to explore the idea that the generic operator GEN is the part of simple futurates which gives them their modal quality, modeling the argument on the one just given for progressive futurates.

This idea of a relationship between generics and simple futurates has come up before; it has been said that there is a “close relationship between habitual activities and the future events resulting from them” (Wekker, 1976). Though of course this point can’t always be true; not every simple futurate reflects a habitual activity. But there is no particular problem, since we also have bouletic ordering to take care of the activities that are not habitual.

We have seen above, as well, that generics have von Stechow’s Homogeneity Presupposition, which could be explained via a direction presupposition.

Furthermore, it is well-known that there is a prohibition against present -SIP predicates. That being the case, we expect -SIP simple futurates, at least, to have a higher +SIP operator that allows them to occur with a *now* input. If it is GEN, the generic operator, that will explain the possibility for simple futurates.

Finally, many languages (e.g. Greek, Romance languages) use the same morphology for both (modal) progressives and generics. PROG and GEN thus obviously have something in common; if they both permit futurate readings, that is another property they have in common.

2.2.3.1 Ordering in generics

Generics do seem to have both inertial and bouletic ordering. Generics famously do not require the event to actually be happening at the time of utterance. For example, (93a) can be truthfully uttered even when no bears are eating meat. But most generics do require the event to have been instantiated; (93b) cannot be true in a case where bears secretly have the ability to engineer corporate takeovers, but have never actually done so.

- (93) a. Bears eat meat.
b. Bears engineer corporate takeovers.

There is also a “lawfulness” requirement; e.g., there must be something true about bears that keeps them eating meat (Kratzer, 1989). It is not just that they all seem to independently happen to decide to eat some meat.²⁴

The only generics that do not require instantiation are generics that are somehow based on rules made by people, as in (94a) and (94b), and generics involving machines as in (94c) and (94d).

- (94) a. Sally handles the mail from Antarctica.
b. The Speaker of the House succeeds the Vice President.
c. This machine crushes oranges.
d. This car goes 140 mph.

I would like to propose that the examples in (94) have a bouletic ordering source. The first two are relatively clear: Sally handles the mail from Antarctica in all situations that have mail from Antarctica and are most compatible with what the boss wants, and the Speaker of the House succeeds the Vice President in all situations where they are supposed to according to the commitments of the Constitution. The machine examples in (94c) and (94d) can be seen as being about what the designer of the machine is committed to.

In all of these cases, if the ordering source is bouletic, the events need not be instantiated. That is what we want. Generics like those in (93), however, must have had their event

²⁴There are some exceptions that are not problematic: lawlike properties of kinds, lawlike behavior inside stories, etc.

instantiated at least once. Those, I would like to propose, use the inertial ordering, and depend on lawlike facts about the world.

2.2.3.2 The Principle of the Excluded Middle revisited

Another similarity between futurates and generics has to do with the Principle of the Excluded Middle. As von Fintel points out, generics and conditionals do obey the PEM; that is, they behave similarly to futurates. For example, the negated generic in (95b) is not true in a situation where one atypical bear does not eat meat; it is, as Carlson (1977) remarks, also a generic, and its truth conditions require that bears generally fail to eat meat.

- (95) a. Bears eat meat.
 b. Bears do not eat meat.

Likewise, the negated conditional in (96b) is true only if on all the worlds being quantified over in which I strike this match, it does not light. It is not true in a case where in some worlds it does light and in some worlds it doesn't.

- (96) a. If I strike this match, it will light.
 b. If I strike this match, it won't light.

Von Fintel, rejecting an explanation of these facts given by Carlson that makes reference to kinds, proposes that generics and conditionals have a presupposition as in (97), from which the PEM follows.

- (97) The Homogeneity Presupposition (von Fintel, 1997)
 $[[\text{GEN}]]^g(f)(p)(q)$ is only defined for w if
 $[\forall x \in f(w)(p): q(x)] \vee [\forall x \in f(w)(p): \neg q(x)]$

While von Fintel speculates about the origin of the Homogeneity Presupposition, he does not propose a definitive derivation. The direction presupposition that I have independently proposed for futurates appears to do the same work as von Fintel's Homogeneity Presupposition. Could they be related? If generics and conditionals such as those von Fintel considers have a direction presupposition, then perhaps the direction presupposition is the

source of the Homogeneity Presupposition. In the next chapter, I will argue that the direction presupposition is in fact an important component of *will*, which provides a source for the Homogeneity Presupposition in conditionals.

2.2.3.3 Generics and the simple futurate presupposition

Now to determine whether our denotation for simple futurates can be modified to account for generic readings of simple forms. Recall our current denotation for simple futurates:

- (98) *A first try at simple futurates.*
 $\text{ALL}_b\text{-simple}(d)(Q^t)(w)(t)$ is defined iff d directs $F^t(q)$ in w at t , and $\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t : $[F^t(q)(w')]$. If defined, $\text{ALL}_b\text{-simple}(d)(Q^t)(w)(t) = 1$ iff $[\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t : $[Q^t(w')]$.

Supposing that simple futurates have a generic aspectual operator “ ALL_t ” as in (99), the denotation for simple futurates is given in (100) below.

- (99) $\text{ALL}_t(p)(w)(t) = q$ iff $\forall t' \supset t: [p(w)(t')]$
- (100) *(A second try at simple futurates.)*
 $\text{ALL}_t([\text{ALL}_b\text{-simple}(d)(Q^t)])(w)(t)$ is defined iff d directs $F^t(q)$ in w at t' , and $\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t : $[q^{\exists t}(w')]$. If defined, $\text{ALL}_t(\text{ALL}_b\text{-simple}(d)(Q^t))(w)(t) = 1$ iff $[\forall t' \supset t: [\forall w'$ metaphysically accessible from w at t' and consistent with d 's commitments in w at t' : $[Q^t(w')]]]$.

The same problem arises here that arose with progressives: The temporal specification is inappropriate for non-furate readings. A more serious difference, however, is that generics don't have the additional presupposition that, we observed simple futurates to have. The question in (101), for instance, does not presuppose that bears eat meat.

(101) Do bears eat meat in the morning?

Therefore the denotation we want for GEN is more along the lines of (102).

(102) $\llbracket \text{ALL}_t(\llbracket \text{ALL}_b\text{-ongoing}(d)(q) \rrbracket^g(w)(t)) \rrbracket$ is defined iff d directs q in w at t .
If defined, $\llbracket \text{ALL}_t(\llbracket \text{ALL}_b\text{-ongoing}(d)(q) \rrbracket^g(w)(t)) \rrbracket = 1$ iff $\forall t' \supset t$:
 $\llbracket \text{ALL}_b\text{-ongoing}(d)(q)(w)(t') \rrbracket = 1$ iff $[\forall w'$ metaphysically accessible
from w at t' and consistent with d 's commitments in w at t' : $\llbracket q(w')(t') \rrbracket]$

The origin of this difference is not clear to me.

2.2.3.4 Summary

To summarize: since the semantics of planning (direction, commitment, and so forth) are necessarily modal, and since there seems to be a similar modality associated with the progressive operator in ongoing readings of progressives, it makes sense to see if these modals could be one and the same. This hypothesis, however, raises the question of how simple futurates get their futurate meaning. I argued that they get it from a generic operator. There is, however, a presuppositional difference between simple futurates and the other forms that was left unexplained.

2.2.4 On directors in the syntax

I have now presented arguments that progressive and generic aspect provide the modality that yields futurate readings. This modality, I argued, involved either inertial or bouletic ordering sources; in the latter case, there is an animate director who is presupposed to have the ability to determine the future.

One question prompted by this discussion is whether we need to have an explicit representation of the director in the syntax and semantics, as is currently the case.²⁵ We saw that some part of the grammar needs to know that plans are more than just sets of future-oriented propositions. What was not clear was what part of the grammar needed to have access to this information.

²⁵Thanks to Sabine Iatridou, p.c., for first posing this question to me.

In the futurate sentences examined so far, the director can be, but need not be, the agent of the sentence. The identity of the director seems to be contextually determined. Given that that is the case, is there any reason for the semantics to “see” the director, by means of an explicit variable, at all? Why wouldn’t the pragmatics just provide for the semantics the set of propositions in the plan, and itself deal with the considerations having to do with director ability and commitment?²⁶.

In this section I will argue that in at least some cases, the identity of the director is apparently constrained by syntax. In these cases it seems that the director must be the subject of the clause. The point of this discussion is that if directors already have to be represented in the syntax, they ought to be visible to the semantics as well, not just to the pragmatics.²⁷

One kind of evidence that directors do interact with syntax in English comes from futurates with manner adverbials.

Manner adverbials are adverbials which can receive different interpretations depending on their location in the sentence; they can either describe the manner of the event (the “manner” reading), or they can describe the manner in which the subject participates in the event (the “subject-oriented” reading) (Jackendoff, 1972). *Cleverly* and *stupidly* are two such adverbs. *Cleverly* in (103a) has only the manner reading: ‘John answered the question in a clever fashion’. (103b), according to Jackendoff, has both that reading and the subject-oriented reading: ‘it was clever of John to answer the questions’. (I find the manner-oriented reading for (103b) somewhat marked.)

- (103) a. John answered the question cleverly.
b. John cleverly answered the question.

That these are two different meanings for the adverbs can be shown by the fact that such adverbs can occur together; (104) says that it was clever of John to answer the question in a stupid manner. That is, his participation was clever, though the event itself was stupid.

²⁶One piece of evidence against such a situation is the fact in (85) above, if it does really involve directors. See also the discussion of dispositional *will* in chapter 3.

²⁷It is not true that in general, all objects visible to the syntax are visible to the semantics, but in this case it is a viable conclusion.

(104) John cleverly answered the question stupidly.

Manner adverbials can generally appear in either position, although in some cases a meaning difference between the two positions is not terribly clear, as in (105):

- (105) a. John answered the question secretly/carefully/suddenly =?
b. John secretly/carefully/suddenly answered the question.

The reason for this seems to be simply that some adverbials are more conducive than others to holding just of the subject's participation in the event, without holding of the event itself (and vice versa).²⁸ This does not mean, however, that these adverbials are different from *cleverly* and its ilk. With a bit of finessing we can set up contexts in which the examples in (106), with apparently contradictory adverbials, make sense. For example, John's answering the question may be secret to some, and obvious to others; he may be quite careful in affecting a careless attitude as he answers; and he might suddenly begin his answer and then take a long time to finish.

- (106) a. John secretly answered the question in plain view.
b. John carefully answered the question carelessly.
c. John suddenly answered the question gradually.

Thus we will consider all of these adverbs to be interpretable with either a manner reading or a subject-oriented reading.

In futurates as well (here we will use only progressive futurates), manner adverbials can have either a manner reading or a subject-oriented reading. The subject-oriented reading of the adverbial, however, appears to involve a description of the subject's participation in the plan, not the subject's participation in the planned event.

- (107) a. Nomar is practicing cleverly/secretly tomorrow.
b. Nomar is cleverly/secretly practicing tomorrow.

²⁸The fact that manner adverbials seem to be predicated of both events and participation in events is quite interesting; I will just acknowledge that it is apparently true, however, without offering an explanation.

The a examples in (107) assert that there is a plan for Nomar to practice cleverly or secretly tomorrow; the b examples assert that Nomar’s making of the plan is clever or secret.

Adverbs can again appear in both slots:

- (108) a. Nomar is cleverly practicing stupidly tomorrow.
b. Nomar is secretly practicing in plain view tomorrow.

In (108a), Nomar’s participation in the plan for him to practice stupidly tomorrow is asserted to be clever. The example in (108b) says that the plan for him to practice in plain view tomorrow is secret.

The point of this discussion is the following data. Certain manner adverbials require the subject to be a director. (109a), for instance, is not felicitous if the subject is not the one in charge of the plan for her to sing tomorrow. An inanimate subject, as in (109b), is not possible at all.

- (109) a. Andrea is magnanimously/reluctantly/egotistically singing tomorrow.
b. # The concert is magnanimously/reluctantly/egotistically happening tomorrow.

Given, then, that an adverbial in a certain position can force an NP in a certain position to be a director, we can conclude that the syntax can “see” directors.

These facts are reminiscent of facts pointed out by Wyner (2000) having to do with passives. Wyner sets out to explain why what looks like an agent-oriented adverbial can comment on Mary’s participation in an event when she is not participating as the agent.

- (110) Reluctantly, Mary was hit by Bill.

I would like to suggest that here Mary is the director, linking this fact to the futurate facts.²⁹

2.3 Conclusion

We have thus far made several significant inroads into the semantics of futurates.

²⁹See also Kratzer (1981) for a similar phenomenon with bouletic modals.

Futurates, I argued, are essentially special cases of progressives and generics and share similar semantics. All have a universal metaphysical modal with bouletic or inertial ordering. Above this modal is an aspectual operator, either $SOME_t$ (for progressives) or ALL_t (for generics). However, futurates of both kinds have an additional temporal specification for the run time of the eventuality with a future relation. Simple futurates in addition have a presupposition that is not shared by the other forms.

I argued as well that the pervasive duality between bouletic and inertial orderings suggested that we should aim for a unification of the two. Directors, the animate entities whose desires provide the bouletic orderings, were argued to be visible to the syntax on the strength of adverbial evidence.

In the next chapter, we will see how some of the same elements, namely bouletic-inertial modality and aspect, contribute to the meaning of *will* and *be going to* sentences.

Chapter 3

Futures

Willow: I think I'm gonna go.
Vampire: Is that what you think?

-*Buffy the Vampire Slayer*,
"Welcome to the Hellmouth," 1997

We saw in chapter 2 that there are two ways for a speaker to be confident enough about the future to use a futurate. One way is to be confident that someone (the agent of the sentence or some other person) has the ability to determine whether an eventuality happens or not, and is committed to making it happen. The other is to be confident that non-accidental properties of the world entail that it will happen. These two options were reflected in bouletic and inertial orderings on a metaphysical modal base, with universal quantification over the set of worlds. Certain differences between progressive and generic futurates were taken to be aspectual in nature; others were left unexplained. A low existential temporal quantifier was held to be responsible for differences between futurate and non-futurate readings.

In this chapter, we shift our attention to another kind of future-oriented expression, represented in English by *will* and *be going to*, as given in (111). The Turkish and Indonesian forms in (112) and (113) are analogues to the English forms; in many cases, where English uses *will* and *be going to*, Turkish uses the Aorist¹ and the Future, and Indonesian uses

¹Traditional terminology strikes again: The Turkish Aorist is used to talk about the future despite the

akan and *mau*, as in (112) - (113) below. Sentences with the future morphemes in the (a) examples share various characteristics, and sentences with the future morphemes in the (b) examples share others; these will all be discussed below.

- (111) a. The Red Sox will defeat the Yankees.
b. The Red Sox are going to defeat the Yankees.

- (112) Turkish
- a. Atla-r.
Jump-Aorist
'He'll jump.'
- b. Atla-yacak.
Jump-Future
'He's going to jump.'

- (113) Indonesian²
- a. Budi akan makan ikan.
Budi akan eat fish
'Budi will eat fish.'
- b. Budi mau makan ikan.
Budi mau eat fish
'Budi is going to eat fish.'

I will avoid calling *will* and *be going to*, and their counterparts in other languages, future “tenses,” for pre-theoretic as well as theory-internal reasons. There is a long-standing debate about whether *will* is a tense or a modal (see, for example, Hornstein (1990); Sarkar (1997)); *be going to* has been variously labeled prospective aspect, futurate, and so on.³ In addition, I will not be analyzing these items as tenses. For lack of a better word, I will call items like *will* and *be going to* simply “futures”.

My position on futures will look very similar to my account of futurates. What futurates share, I argued, is a certain modal element; where they differ is in the aspectual component

fact that most aorists are used to talk about the past.

²The facts given here only hold in some dialects of Indonesian. In others *akan* behaves like *mau*, with the exception of the data in (196) in section 3.4.4 below.

³*Be going to* has not been much discussed in the formal literature, but it has been discussed in cognitive grammar approaches; see Brisard (2001) and references cited therein.

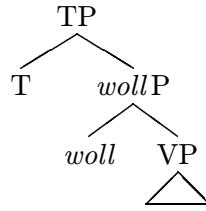
of their meaning. The same is true, I will argue, for futures: They share a modal element, and they differ from each other aspectually. While futures and futurates of course differ in some important ways (to be discussed in more detail below), it turns out that we can justifiably treat a version of the modal element in futurates defined in chapter 2, ALL_b , as a decent first approximation to the modal element of futures. Likewise, I will assume no appreciable difference between the aspectual components I proposed for futurates ($SOME_t$ and ALL_t) and the aspectual components in futures. I will have some speculations about where the differences between futures and futurates lie, but the majority of this chapter does not involve those differences.

The reader may well ask why I have bothered to write this chapter at all, if futures are so similar to futurates. One reason to bother is that it is not a trivial result if futurates and futures should turn out to share a great deal of their semantics. A second reason is that a discussion of their similarities provides a basis on which to frame questions about their differences, more precisely than could be done otherwise. Finally, since futures are, for some reason, permissible in a larger set of contexts than are futurates, it is possible to run tests on futures that are not possible with futurates, and thus find out more about the modal and aspectual nature of future reference.

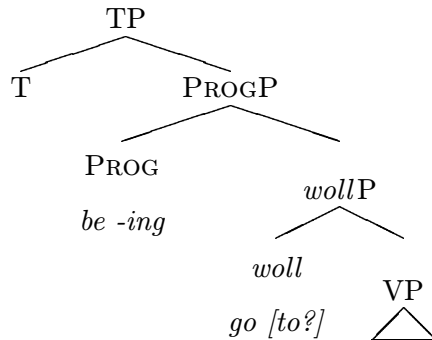
Here is the hypothesis about futures, in brief: The modal is a version of ALL_b , and has both bouletic and inertial orderings. On the aspectual side, I will argue that *be going to* is the *progressive future* $SOME_t + ALL_b$ and that there is both a generic version of *will* ($ALL_t + ALL_b$) and a null aspect (perfective) version of *will* (ALL_b). The aspects have detectable effects on the modal characteristics of these futures.

Among those who consider *will* to have a modal component, it is commonplace by now to assume that *will* and *would* are the present and past tense versions of a future modal termed *woll*; so far as I understand, the idea originally appears in Abusch (1985). We will call the version of ALL_b to be used here as *woll*. I first proposed that *woll* could support aspect as well as tense in Copley (2001a). On that account, *will* and *would* have no aspect, while *be going to* has a progressive operator, as in the structures below:

(114) *Will/would*



(115) *Be going to*



In Copley (2001a, 2002), I identified the aspectual, non-modal component of *be going to* as PROG, i.e., the same operator that makes progressives progressive. Although I will defend essentially the same denotation here, I would like to note that the aspectual component is what I have been calling $SOME_t$; as we saw in chapter 2, and as many have argued, such an operator does not account for the meaning of progressives.

But why shouldn't we, e.g., put GEN, a real generic, on top of a future modal such as ALL_b , for the meaning of a generic *will*? That combination would be true just in case in generic situations a particular eventuality will happen. This is a meaning we get in Indonesian with imperfective *sedang* in front of *akan*:

- (116) a. Wati selalu sedang makan durian.
 Wati always Impf eat durian
 'Wati is always eating durian.'
- b. Wati selalu sedang akan makan durian.
 Wati always Impf will eat durian
 'Wati is always about to eat durian.'

(Note that this meaning is not the same as the so-called “dispositional *will* reading, which (116b) lacks: ‘If Wati gets a durian, she will eat it.’ I will discuss dispositional *will* in section 3.4 below.)

Sedang in its generic meaning is, we assume, GEN, and *akan*, as we will see later, is likely to be a bare (aspectless) future. The meaning of (116b) is that of a real generic on a real future. In contrast, English *will* seems to have no such reading, as one attempt attests:

(117) # Wati always will eat durian.

A real generic on a real future is *not* the denotation of what I will be calling generic *will*. I will give justification for the ALL_t + ALL_b denotation shortly.

A great deal of evidence will be required before we can truly assess the extent to which future and aspectual morphemes within and across languages share semantic components, and the extent to which they differ. The goal of this chapter is to begin this assessment for English. First, in section 3.1, I lay out some of the evidence for both an modal and an aspectual component in futures, and point out some differences between futures and futurates.

In section 3.2, we find that the aspectual quantifier, or lack thereof, affects the modal properties of the sentence, providing evidence for the hypothesized denotations. In section 3.3 I use another interaction between aspect and modality in futures to predict certain facts about *be going to*, indicating certain restrictions on inertial orderings. Section 3.4 returns to *will* with a hypothesis about the meaning of dispositional *will*. Section 3.5 concludes the chapter.

3.1 Ordering and aspect in futures

We will begin, in section 3.1.1, by demonstrating for futures what we demonstrated earlier for futurates: namely, that the ordering source can be either bouletic or inertial. Section 3.1.2 presents some evidence for aspectual distinctions in futures; this result too is similar to what we found with futurates, though there are differences as well, which are discussed in more detail in section 3.1.3.

3.1.1 Ordering in futures

In chapter 2, I proposed that both progressives and generics involved similar universal metaphysical modals, and that these modals had two possible orderings. One possible ordering was inertial: I treated Dowty's (1979) inertia worlds, designed to deal with progressive modality, as a set of worlds provided by an inertial ordering on a metaphysical modal base (following Portner (1998), e.g.). I extended the account to explain properties of generics as well. The other possible ordering was bouletic, where the person with the commitments was either the agent or some other contextually specified animate entity. Generics and (possibly) progressives seemed to have both bouletic and inertial readings, regardless of whether the readings were futurate or not. This led us to consider a unification of bouletic and inertial orderings as a desirable goal.

It seems unobjectionable to say that in futures, universal modality is also at work. In this section I will argue that the universal modal at work in both *will* and *be going to* has both inertial and bouletic orderings, and then point out a number of puzzling differences between these orderings in futures and futurates.

3.1.1.1 Inertial and bouletic construals of futures

In Dahl's (1985) survey of the tense and aspect systems of 64 genetically and areally diverse languages, he found a large number of items that were used in both a "prediction" sense and an "intention" sense. I will argue here that both inertial ("prediction") and bouletic ("intention") orderings occur in English futures as well. Let us first suppose that you have a friend who does not always show up when she says she will. You are supposed to meet her at 5, but you are expressing doubt that she will show up. Another friend might say the sentence in (118), to comfort you.

(118) Don't worry, she'll be there at 5.

The other friend has two possible reasons for asserting this: either he believes that some fact about the world will ensure that she is there (she has something just before 5 in the same room, she always walks by there at 5, etc.) or that he believes some person will personally ensure that she is there, and has the power to do so. The first reason seems to reflect an inertial ordering, and the second a bouletic ordering.

The bouletic ordering, by the way, really does depend on a presupposed director's ability to ensure that the eventuality will happen. For example, if your forgetful friend says (119) and you believe her, and believe that she really directs that proposition, then that is all the assurance you need.

(119) Don't worry, I'll be there at 5.

If, though, you believe that she does not direct that proposition, perhaps because she is overly busy and distractible, you might not believe her.

The two orderings are clearer (for some reason) when sentences like these are embedded. Normally when a speaker utters (120), they presuppose that they are the director of their own actions. The speaker might continue with (120a). However, there is a reading in which the speaker presupposes that inertia determines what will happen; i.e., the speaker believes that certain facts about the world will cause the speaker to go to Harvard Square. In that case the speaker might continue with (120b).

(120) I think that I will go to Harvard Square tomorrow...

- a. ...I've been meaning to get some shopping done.
- b. ...that's just the kind of thing I might do.

The same split between intention and prediction is available for *be going to* as well.

(121) I think I'm going to go to Harvard Square tomorrow.

The bouletic-inertial split also has something to say about a certain, somewhat archaic opposition (Leech, 1971). Many speakers, even some who do not normally use *shall*, find a difference between (122a) and (122b). (122a) is plausible, while (122b) might be said only by a person bent upon suicide:

- (122) a. No one will help me; I shall drown!
b. No one shall help me; I will drown!

If *will* favors a bouletic, and *shall* an inertial ordering, we can say why there is a contrast between (122a) and (122b). The *will* clauses express what the speaker intends (with a direction presupposition that it will come to pass), while the *shall* clauses express what will

happen if facts about the world are allowed to determine what happens, presupposing that they will.

Now, let's move ahead to try to formalize these intuitions about future modality. The obvious starting point should be the denotations and definition of direction from chapter 2, since evidently future modality and futurate modality are quite similar. If we consider the futurate denotations from chapter 2, though, we find a number of discrepancies that prevent us from treating futurates and futures in exactly the same manner. These discrepancies are thorny enough that I will do little more than present them here. (Fortunately, even without a complete understanding of the modality in futures, we will still be able to investigate aspect in futures in section 3.1.2, and interactions between the modality and aspect, in sections 3.2 and 3.3.)

3.1.1.2 Different directions

Recall the last two definitions of direction from chapter 2, repeated below. The only difference between them is that in (123), propositions (type $\langle w, \langle i, t \rangle \rangle$) are the things that get directed, while in (124), predicates of worlds (type $\langle w, t \rangle$) are what gets directed.

(123) *A third try at direction.*

An entity d *directs* a proposition p in w at t iff: $\forall w'$, d has the same abilities in w' as in w :

$[\forall w''$ metaphysically accessible from w' at t and consistent
with d 's commitments in w' at t :

$[\forall w'''$ metaphysically accessible from w at t :

$[\exists t' > t: [p(w'')(t')] \Leftrightarrow [\exists t'': > t: [p(w''')(t'')]]]]]$

(124) *A fourth try at direction.*

An entity d *directs* a predicate of worlds P in w at t iff: $\forall w'$, d has the same abilities in w' as in w :

$[\forall w''$ metaphysically accessible from w' at t and consistent
with d 's commitments in w' at t :

$[\forall w'''$ metaphysically accessible from w at t :

$[[P(w'')] \Leftrightarrow [[P(w''')]]]]]$

We preferred the definition in (124) over the definition in (123) for two reasons.

The first is that the presupposition and assertion in simple futurates required the definition to refer to both a proposition evaluated at any future time, and a proposition evaluated at a particular future time. Simple futurates (in contrast to progressive futurates) presuppose that the director is committed to the eventuality's happening (or that lawlike facts about the world entail the eventuality's happening) at some time; what they assert is that that eventuality will happen at a particular time. For example, while the progressive futurate in (125a) presupposes nothing about whether the director is committed to the eventuality's happening at some time, the generics in (125b) and (125c) both do have such a presupposition.

- (125) a. Joe isn't skydiving tomorrow.
b. Joe doesn't skydive tomorrow.
c. The moon doesn't eclipse the sun at 5:13am tomorrow.

The second reason that the definition in (124) worked well for futurates is that progressive and simple futurates alike seem to require a temporal specification in order to get a futurate reading. The sentences in (126), for example, are not interpreted as futurates unless a definite future time is contextually available.

- (126) a. Joe is skydiving.
b. Joe skydives.

Thus it made sense to say that what gets directed is a proposition evaluated at a particular time.

These two reasons, however, do not apply to futures, which looks like evidence that the revised definition in (124) is not correct for futures. A *will* sentence does not have the presupposition that the director is committed to the eventuality's happening at some time; the sentence in (127) does commit the speaker to the belief that the Red Sox will win the World Series someday.

- (127) The Red Sox won't win the World Series next year.

Neither do futures require an overtly or covertly specified future time in order to have a future-oriented readings; the skydiving eventuality in the sentences in (128) can only be future-oriented.

- (128) a. Joe will skydive.
 b. Joe is going to skydive.

It is reasonable to assume, then, that propositions, not predicates of worlds, are what is directed in futures. In which case, the denotation of *woll*, the future modal, should be something like the following try at ALL_b from chapter 2.

- (129) $ALL_b(d)(q)(w)(t)$ is defined iff d directs q in w at t .
 If defined, $ALL_b(d)(q)(w)(t) = 1$ iff $\forall w'$ metaphysically accessible from w at t and consistent with d 's commitments in w at t :
 $[\exists t' > t: [q(w')(t')]]$

It is not immediately clear where this assumption might take us. Let us briefly consider a few other differences between future and futurate modality, indulging in a bit of speculation, after which we will abandon this thread and take up the question of aspect in futures.

3.1.1.3 Inertial differences

There are several differences between inertial futures and inertial futurates. The most striking difference is that inertial futurates place a restriction on their eventuality. For example, raining eventualities are not acceptable in futurates:

- (130) a. # It's raining tomorrow.
 b. # It rains tomorrow.

In chapter 2, I suggested that (130a,b) have no futurate readings because in inertial futurates, the occurrence of the eventuality must be entailed by lawlike facts about the world. Since there are no laws that force rain to occur at a particular time, (130a) and (130b) are not good as futurates. (If there were such laws, (130a,b) would be good.) I contrasted this state of affairs with sentences like (131), in which the eventuality's happening is entailed by lawlike facts, and a futurate reading is possible.

(131) The sun rises tomorrow at 5am.

Futures, though, are much more permissive, allowing future reference even when the eventuality's happening follows from mere accidental facts.

- (132) a. It's going to rain.
b. It will rain.

A second difference is that although progressive futurates are considered by most speakers to be a bit strange with inertial orderings, as in (133a), inertially ordered progressive futurates, as in (133b), are not strange.

- (133) a. ? The sun is rising tomorrow at 5am.
b. The sun is going to rise tomorrow at 5am.

It may be that what is odd about (133a) is that it asserts that there is an interval surrounding the present in which lawlike facts are asserted to entail the sun's rising tomorrow at 5am. This is a bit strange, because lawlike facts should hold over every interval surrounding the present, by virtue of being lawlike. Somehow the future in (133b) escapes this problem. If, as I suggested above, inertial futures require the eventuality's happening to follow only from accidental facts, then perhaps there is a way to derive this difference.

3.1.1.4 Bouletic differences

There are also differences between bouletic futures and futurates, though these are more subtle. Speakers agree that there is some difference between (134a) and (134b), though they find it difficult to put their finger on what it might be.

- (134) a. I'm teaching tomorrow.
b. I'm going to teach tomorrow.

For reasons that are not clear to me, the contrast is a bit sharper under an intensional predicate such as *think*, as in (135).

- (135) a. I think I'm teaching tomorrow.
b. I think I'm going to teach tomorrow.

Suppose we only consider bouletic readings in which the speaker is the director. The embedded futurate in (135a) seems to convey that the decision has already been made; the speaker has forgotten what his exact commitments are, but thinks that they entail that he teaches tomorrow. This situation, it seems to me, is not compatible with the utterance of (135b), in which, perhaps, the decision to teach tomorrow is in the process of being made.

3.1.1.5 Summary

Futures, like futurates, exhibit both inertial and bouletic orderings. There are a number of modal differences between futurates and futures that we cannot yet explain. At this point, I would like to leave the precise characterization of future modality aside, and argue for aspectual components in futures.

3.1.2 Aspect in futures

In this section I argue that futures have three possible aspectual values: generic, progressive, and no aspect at all (bare). These are the working denotations to be used. First, the bare future (pronounced *will*):

$$(136) \quad \text{ALL}_b(d)(q)(w)(t) = 1 \text{ iff } \forall w' \text{ metaphysically accessible from } w \text{ at } t \text{ and} \\ \text{consistent with } d\text{'s commitments in } w \text{ at } t: [q(w')(t)] \\ \text{Presupposed: } d \text{ directs } p \text{ in } w \text{ at } t$$

Secondly, the generic future (also pronounced *will*):

$$(137) \quad \text{ALL}_t(\text{ALL}_b(d)(q))(w)(t) = 1 \text{ iff } \forall t' \supset t: [\forall w' \text{ metaphysically accessible from } w \text{ at} \\ t' \text{ and maximally consistent with } d\text{'s commitments in } w \text{ at } t': \\ [\exists t'' > t': [q(w')(t'')]]] \\ \text{Presupposed: } d \text{ directs } q \text{ in } w \text{ at } t'$$

A generic future, despite its genericity, can be used to talk about a definite future time. Generic *will* would be expected to have the meaning that in all situations overlapping the present, a contextually specified director wants *p* at some future time. In (138) is an example of a generic future, with a definite time at which the snowing is to happen.

$$(138) \quad \text{Don't worry, it'll snow tomorrow — it always snows on my birthday.}$$

What is generic is the director's (in this case, the world's) commitment to the snow. The eventuality itself, however, occurs at an existentially bound time.⁴

The progressive future is by hypothesis *be going to*, and has the following denotation:

- (139) $\text{SOME}_t(\text{ALL}_b(d)(q))(w)(t) = 1$ iff $\exists t' \supset t$:
 $[\forall w'$ metaphysically accessible from w at t' and maximally consistent with d 's
 desires in w at t' : $[\exists t'' > t'$:
 $[q(w')(t'')]]]$
 Presupposed: d directs q in w at t'

Now we will want to see if there is support for this three-way distinction among bare, progressive, and generic futures. The hardest part (for purely morphological reasons) is to make the case for a distinction between a bare *will* and a generic *will*. There are two kinds of tests that distinguish them: a present temporal input to *will*, which is examined in section 3.1.2.1, and generic readings of indefinites, in section 3.1.2.2. Both of these should be possible with generic *will* but not with bare *will*; it turns out that the prediction is borne out.

Having distinguished two readings of *will*, we will then differentiate the meaning of the progressive future *be going to* from the generic future. Present input should be possible with the progressive future *be going to*, but generic readings of subjects should not be. These predictions are borne out as well.

3.1.2.1 Present temporal input

In chapter 1, I discussed a constraint against present temporal input with -SIP predicates (predicates that lack the subinterval property; originally due to Dowty (1979)). We expect generic and progressive futures to be +SIP, by virtue of having a high +SIP predicate (ALL_t or SOME_t). Bare futures we might expect to be -SIP. We thus might expect the present -SIP constraint to discriminate between generic and progressive futures on the one hand, and the bare future on the other hand. In fact, this expectation turns out to be correct. Two kinds of evidence point to a split between +SIP and -SIP futures: present input contexts

⁴As with generic futurates.

that rule out generic readings (section 3.1.2.1.1), and embedding under *I can't believe (that)* (section 3.1.2.1.2). The split itself is clear, though the explanation for the facts turns out not to be as simple as might be desired.

3.1.2.1.1 Contexts that rule out generics Since present input rules out the perfective reading, we expect that a context that provides a present temporal input and that rules out the generic reading should not permit *will* sentences at all. *Be going to* sentences, being non-generic, and having the subinterval property, should still be permitted.

If we carefully consider the question of which contexts might rule out generics, we see immediately that it is a tricky question. The point about generics is that they are assertable even in contexts where the eventuality described is not taking place. However, just because a context is compatible with the assertion of a generic, it does not follow that the generic is assertable only on the basis of the situation the speaker finds himself in. Suppose, for example, we are walking along in Scotland and we see a black sheep. From a situation such as the minimal one containing us and the sheep, we are clearly not entitled to conclude (140a). Somehow, *oh look!* at the beginning of the utterance highlights the sense that the only situation we are talking about is the current one. We could comment on the blackness of Scottish sheep, as in (140b), but then we would not be making a claim about the current situation.⁵

- (140) a. # Oh look, sheep in Scotland are black.
b. Did you know, sheep in Scotland are black.

Generic *will*, if that is what it really is, should work the same way. We expect generic *will* sentences to be infelicitous when it is in only a very small set of intervals overlapping the present that the world or an animate director wants *q*, not in *all* intervals overlapping the present.

⁵Peter Svenonius (p.c) points out to me that this is not true of all generics; sometimes you can assert a generic on the basis of a single observation:

(i) Oh look, copper conducts electricity.

(ii) (After looking at all the sheep in Scotland but one, and upon seeing the last one) ?Oh look, sheep in Scotland ARE black.

These cases will not matter to us here, however.

This turns out to be the case. If clouds have gathered and rain is imminent, we can use the progressive and say (141a), but not (141b).

- (141) a. Oh look, it's going to rain.
b. # Oh look, it'll rain.

Likewise, plausibly, with (142) and (143):

- (142) a. Guess what? We're going to get married!
b. # Guess what? We'll get married!
- (143) a. Oh, no! He's going to jump!
b. # Oh no! He'll jump!

Where it is clear that it is on the basis of the way things generally are that we are speaking, rather than about the present situation, of course we can say things like (144).

- (144) Don't worry, it'll rain.

Since the bare reading is ruled out by virtue of the present temporal input and the present -SIP constraint, the only possible reading of *will* in (144) is the generic reading.

3.1.2.1.2 Some unbelievable data Consider for a moment the expression *I can't believe (that) p*. It has two readings: a literal reading, true if the speaker literally is unable to believe *p*, and an idiomatic reading, in which the truth of *p* is presupposed, and the speaker is only expressing amazement at the truth of *p*. For example, the literal reading of (145) might be used in a context where you have just met someone and want to express doubt that they in fact are married. The idiomatic reading might be used if you are at a friend's wedding reception, where you are in no doubt about whether he is married or not; you can use (145) to express your amazement about that fact.

- (145) I can't believe you're married!

That the truth of *p* is presupposed in the idiomatic reading is shown by the fact that either a yes or a no answer to the question in (146) still commits the answerer to the proposition that the speaker is married.

(146) Can you believe I'm married?

In what follows, we will be interested in the idiomatic reading, precisely because of this presupposition. Since the presupposition is evaluated in the present, we expect *p* to be impossible when it lacks the subinterval property (that is, when it is -SIP). This is indeed the case. A stative is possible as in (145); futurates are possible as in (147a,b), generics are possible as in (147c), and past tense⁶ as well, as in (147d).

- (147) a. I can't believe you are getting married next week!
b. I can't believe you get married next week!
c. I can't believe people get married all the time in this hall!
d. I can't believe you got married last week!

Non-furate readings of (147a) and (147b) are not possible at all. (Recall that futurates are +SIP because their highest operator is either ALL_t or $SOME_t$.)

- (148) a. # I can't believe it's raining tomorrow!
b. # I can't believe it rains tomorrow!

So *I can't believe (that) p* is a good way to detect whether the highest predicate in *p* has the subinterval property or not.⁷

Now, consider the cases in which *p* is a future sentence. We expect to be able to get the idiomatic reading with *be going to*, since (by hypothesis) it is progressive. The question then is whether *will* can get the idiomatic reading in (149b). It seems that it cannot. But it can get the non-idiomatic reading.

- (149) a. I can't believe you're going to get married next week!
b. I can't believe you'll get married next week! #idiomatic reading

This is an odd result. The assertion, which is embedded, apparently does not violate the present -SIP constraint, while the presupposition, interpreted as if it is not embedded,

⁶Recall the suggestion made in chapter 1 that past tense behaves as if it has the subinterval property with respect to the present -SIP constraint. Since past tense is a predicate of times, and it meets the criteria for the subinterval property, I treat it as such. This idea is revisited in chapter 4. Et cetera.

⁷Of course testing whether *p* can occur in the matrix clause without a futurate reading is also a good way to detect the SIP value of *p*. When *p* is a future clause, however, speakers seem to find the judgment much sharper in the embedded cases given here.

does trigger a violation of the constraint. Suppose that the violation is telling us that the embedded clause is in fact -SIP. But then, why should embedding bleed the present -SIP constraint in this case?

I have no answer to that question, but here is a reason to think that that question is the right one. Some speakers report that in a present input context where generics are ruled out, a *will* sentence improves under an intensional verb like *think*, as in (150).

- (150) a. # It'll rain.
b. I think it'll rain.

Will is in marked contrast to simple form -SIP predicates, which do not improve.

- (151) a. # It rains.
b. # I think it rains.

Here too, it could be that embedding somehow saves the -SIP bare *will* sentence from violating the present -SIP constraint.

What about the proposed generic version of *will*? Sometimes *will* clauses can support the idiomatic reading of *I can't believe (that) p*. For example, suppose that Mary has just come out of the closet (on the idiomatic reading). Her grandparents, who we may suppose had been looking forward to attending her wedding, might utter (152) even if they accept Mary's life choice and merely wish to express their amazement that the wedding will never happen.

- (152) I can't believe Mary will never get married!

What can we say about this use of *will*? At the very least we may say that it is +SIP. I suspect this is a generic reading of *will*. The other use of *will*, exemplified in (149b), is perhaps best thought of as -SIP, with something strange going on with the embedding.

To summarize, the present input tests show that there are two readings of *will*: one that allows present input (and which has something of a generic "flavor" to it), and one that does not. *Be going to*, by hypothesis a progressive future, permits present input as expected. Next we will look at how indefinites are interpreted in futures; if they have different aspects, we should be able to see a difference.

3.1.2.2 Indefinites

As has been noted (Dowty, 1979; Carlson, 1989a; Diesing, 1992), generics allow generic readings of indefinites, while progressives do not. For instance, while (153a) allows a generic reading of the subject, making a claim of typical children, (153b,c) generally has only an existential reading for the subject, claiming that some kids are currently eating candy:

- (153) a. Kids eat candy.
 b. Kids are eating candy.

This is not to say that generic readings of bare plurals are always impossible with progressives; on the contrary, they are possible in the presence of a “related constituent” in the Carlson (1989b) sense:

- (154) a. Kids are always eating candy.
 b. Kids are eating candy more and more these days.

What about perfectives? Perfectives, again, are hard to come by in English because it is difficult to distinguish them from generics; they both use the simple form of the verb. In a language that does distinguish them, however, such as Greek, perfectives do not allow a generic reading of indefinite subjects.

- (155) a. Ena pedhi etroge psomotiri.
 D child eat.past.impf bread.with.cheese
 ‘A child ate.impf bread with cheese.’ $\sqrt{\text{GEN}}, \sqrt{\exists}$
- b. Ena pedhi efage psomotiri.
 D child eat.past.pf bread.with.cheese
 ‘A child ate.pf bread with cheese.’ $*\text{GEN}, \sqrt{\exists}$

If the quantifiers we have been treating as temporal quantifiers, ALL_t and SOME_t , are really situational quantifiers as I have been hinting, then there is an explanation for these facts. Generic readings stem from universal situational quantification (Kratzer (1989); Chierchia (1995), e.g.) when the indefinite is allowed to be interpreted in the restriction of the quantifier (Diesing, 1992). Progressives have an existential situational quantifier while generics have a universal situational quantifier, therefore it is natural that progressives

should not (easily) get generic readings of bare plurals while generics do. If, though, a universal situational quantifier is added, as in the examples in (154), it becomes possible to get a generic reading of an indefinite in progressive sentences.

Like progressives, and unlike simple verb forms, *be going to* does not generally have generic readings in the absence of a “related constituent” in the sentence. On the other hand, *will* does license generic readings in those contexts. This is demonstrated in (156), which parallels (153) above: (156a) has a generic reading of the bare plural, about the tendency of kids to eat candy,⁸ but (156b) has a tendency to make only an existential claim.

- (156) a. Kids will eat candy.
b. Kids are going to eat candy.

As with progressives, generic readings of indefinite subjects in *be going to* sentences improve when there is a universal situational quantifier in the sentence. The sentence in (157a), for example, may be used to make a prediction that it will always be the case that kids will be candy-eaters.

- (157) a. Kids are always going to eat candy.
b. Kids are going to eat candy no matter what you do.

These facts can be explained if *be going to* and PROG both contain SOME_t, and generic *will* and GEN both contain ALL_t. The similarity between *be going to* and PROG on the one hand, and generic *will* and GEN on the other, thus provides some support for the hypothesis.

3.1.2.3 Distinguishing bare and generic *will*

A few words, before we move on, on distinguishing bare and generic *will*, since English morphology is so unhelpful in this regard.

Let’s take stock of what we know so far. We have learned that sometimes *will* clauses take present input and sometimes they don’t. If a *will* clause allows present input, it has at

⁸There are actually two readings here, one with generic *will* (kids just generally eat candy) and one with dispositional *will* (kids will eat candy if you offer it to them). I will continue to postpone discussion of dispositional *will* until section 3.4.

least a generic *will* reading. If it does not allow present input, it has no generic *will* reading (and incidentally, no bare *will* reading either). So the present input tests constitute tests for the presence of the generic *will* reading.

The indefinite test is not useful in distinguishing different readings of *will*, because of the fact that generic *will* is predicted to allow both generic and existential readings of indefinites. Bare *will* sentences, we predict, should only allow existential readings. So, if a *will* sentence is ambiguous between a generic *will* reading and a bare *will* reading, it should allow both generic and existential readings, just like a *will* sentence that has only a generic *will* reading. If we had a context in which we expected the generic *will* reading to be ruled out, but the bare *will* reading to be permitted, then we could see if bare *will* only permits existential readings of indefinites, as predicted.

3.1.2.4 Summary

In this section I presented evidence for three aspectual values of futures. The evidence was in the form of present temporal input evidence, which disallows perfectives but allow generics and progressives, and generic readings of indefinites, which only occur with generics.

I would like to concentrate now a particular interaction between modal and aspectual properties of futures. Although the denotations we have so far for futures cannot explain all the data presented above, it turns out that the denotations are accurate enough to account for this interaction.⁹ In the next section, I will demonstrate that the aspectual operator in futures, or the lack of one, constrains the accessibility relation of the modal operator.

3.2 Aspect constrains the accessibility relation

Here I lay out some facts that reinforce the analysis of *be going to* as a progressive future, and indicate that the progressive operator SOME_t proposed in the denotation of *be going to* affects the future modal ALL_b .¹⁰ We begin with a puzzle about offering.

⁹The reader can, incidentally, verify that many of the tests used in the next two sections are not possible to run on futurates — more unexplained differences.

¹⁰As we will see in chapter 4, some of the same tests for aspect constraining the accessibility relation can be done with futurates as well; it is easier to show it with the futures first, however.

Driving along the highway in California one day, I saw a billboard advertising a mechanic's shop in Madera. It included the sentence in (158a). The puzzle is: Why couldn't it instead have included the sentence in (158b)?

- (158) A sign seen (and one not seen) on the highway
- a. We'll change your oil in Madera.
 - b. # We're going to change your oil in Madera.

The property of the context that is relevant here is that the author of the billboard is making an offer. The difference between (162a) and (162b) seems to be that *will* can be used to make an offer, while *be going to* cannot; (162b) sounds more like the author of the billboard is informing the motorist of a fact, or indeed making a threat, rather than making an offer. So the puzzle becomes: Why can't *be going to* be used to make an offer?

3.2.1 The pragmatics of offering

Suppose we consider in more depth what it is to make an offer. There are three issues to consider: the contribution of the speaker, the contribution of the hearer, and temporal restrictions.

First, the speaker. It seems clear that only someone who believes they can direct whether an eventuality happens or not can felicitously make an offer for that eventuality to happen. I cannot offer for it to rain tomorrow, for instance, because I have no authority over the weather, and I know it. The definition of direction we will use for futures is repeated below.

(159) *A third try at direction (direction for futures).*

An entity *d* *directs* a proposition *p* in *w* at *t* iff: $\forall w'$, *d* has the same abilities in w' as in *w*:

$[\forall w''$ metaphysically accessible from w' at *t* and consistent

with *d*'s commitments in w' at *t*:

$[\forall w'''$ metaphysically accessible from *w* at *t*:

$[\exists t' > t: [p(w'')(t')] \Leftrightarrow [\exists t'': > t: [p(w''')(t'')]]]]]$

So in order for an individual *d* to be able to make a valid offer to carry out a eventuality of

which q holds, d must direct q . (In which world(s) and at which time the speaker should direct q is as yet not clear; we will get to that question shortly.)

The hearer, whom I will refer to as h , also seems to have some control over whether the q -eventuality occurs. It should happen if h wants it to happen, and, equally importantly, it should not happen if h doesn't want it to happen.¹¹ It would certainly be rude for someone to make an assertion that entails that in some worlds where you do not want them to change your oil, they do it anyway. For an utterance to count as an act of offering, the speaker's carrying out of the offered eventuality has to be contingent on the interlocutor's preferences.

Could we say then that d and h both direct q ? In a way, that is true, but it is significant that h only ends up directing q as a consequence of h 's desires being important to d . To put it another way, the fact that d directs q is presupposed, while the proposition that h directs q is somehow asserted or entailed. Let's treat a sentence of offering as a conditional with an elided antecedent *if you want q* , an overt consequent *will q* , and a presupposition that d directs q . And let us further say that in making a valid offer, d is also committed to the truth of the proposition expressed by the conditional *If you don't want q , won't q* .¹²

There is one point now to make about temporal interpretation of these elements. The antecedent and the consequent of both conditionals must all have the same time of evaluation; the time at which h wants, or doesn't want, q must be the same time that d is prepared to carry out, or not carry out, q . What matters for the offer is not whether you want q now, but whether at some non-past, contextually salient time, you want q . To show this, let's suppose that someone says she will bring you food tomorrow if you are hungry now, and won't if you are not hungry now. But perhaps you are full now; that means the speaker will not bring you any food tomorrow. Under the assumption that your being hungry now does not have anything to do with whether you are hungry tomorrow, this speech act, according to what we have said, turns out not to be an act of offering, which is intuitively correct.

Let's assume the following pragmatic condition on acts (speech or otherwise) that are offers.

¹¹On the neg-raising reading of *doesn't want*, of course.

¹²Note that the hearer need not be referred to in the offer: *I'll mow the lawn* can be a perfectly fine offer.

- (160) *Condition on offers:* A person *d* has offered in *w* at *t* to bring about *q* for *h* only if *d* believes that for all worlds *w'* metaphysically accessible from *w* at *t*: there exists a time *t'*: *d* directs *q* in *w'* at *t'*,: for all times *t''* later than *t'*: for all worlds *w''* compatible with *h*'s commitments in *w'* at *t'*,: for all worlds *w'''* metaphysically accessible from *w'*, *t'*: $q(w'')(t'') \Leftrightarrow q(w''')(t'')$

Leaving out the worlds and times we can abbreviate this condition as follows:

- (161) A person *d* has offered to bring about *q* for *h* iff *d* believes *d* directs *q* and:
- a. If *h* wants *q*, *q*.
 - b. If *h* doesn't want *q*, not-*q*.

This characterization of the offering context will now allow us to determine what the problem is with using *be going to* in an offering context.

3.2.2 Back to the billboard

Returning to our billboard, we can now say that in order for the author of the billboard to truly be making an offer, they must be able to consistently assert both of the following:

- (162)
- a. If you want us to change your oil in Madera, we'll change your oil in Madera.
 - b. If you don't want us to change your oil in Madera, we won't change your oil in Madera.

According to our assumption, an offering utterance has an antecedent whether or not it is pronounced. In that case, the billboard utterances actually have the meaning of the conditionals given in (163):

- (163) Revision of the billboard utterances
- a. (If you want us to change your oil in Madera,) we will change your oil in Madera.
 - b. # (If you want us to change your oil in Madera,) we are going to change your oil in Madera.

Now we have another way to restate our puzzle. The conditional in (163a) is identical to the conditional in (162a). The speaker of (163a) can of course also assert (162b), which fits nicely with the intuition that a *will* sentence can be an offer, because in order to make an offer, one must be able to assert both (162a) and (162b).

As for *be going to*, (163b) is, like (158b), infelicitous. This ought to be because the speaker of (158b) cannot also assert both (162a) and (162b), the conditions on offering. In fact, there seems to be no problem with the speaker of (158b) asserting (162a). Rather, the problem seems to be that the speaker of (158b) cannot then agree with the statement in (162b). So the final version of our puzzle is: Why wouldn't the speaker of (163b) be able to agree with (162b)?

Before we answer this question, let us note that it is not only English that has this property; the Indonesian and Turkish futures behave similarly. For example, the sentences in (164a) and (165a) could be used to respond to "I need a volunteer. Who will make coffee?" The sentences in (164b) and (165b) could not, unless the answerer was already going to make coffee regardless of what the asker wanted.

(164) Turkish

- a. Ben kahve yap-ar-ım.
I coffee make-aorist-1sg
'I'll make coffee.' offer ok
- b. Ben kahve yap-acağım.
I coffee make-future-1sg
'I'm going to make coffee' #offer

(165) Indonesian

- a. Saya akan membuat kopi.
I akan make coffee
'I'll make coffee.' offer ok
- b. Saya mau membuat kopi.
I mau make coffee
'I'm going to make coffee.' #offer

The puzzle is therefore not just a puzzle about futures in English, but about futures in other languages as well.

3.2.3 Proposal

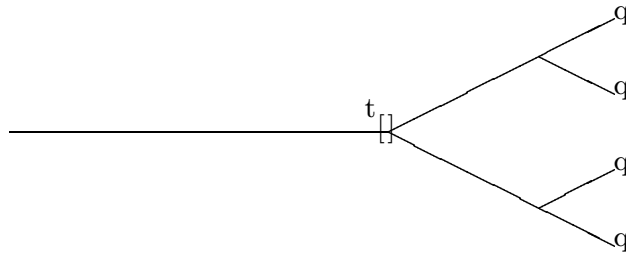
Let's return to English, and to the version of the billboard puzzle we ended with: Why wouldn't the speaker of (163b) agree with (162b)?

As promised, my answer to this puzzle will rely on an aspectual difference between *be going to* and *will*. Let us assume, as I suggested in the introduction to this chapter, that *be going to* involves the progressive operator $SOME_t$, plus the universal boulerthial modal ALL_b , lower in the structure. Assume as well that *will*, in these cases at least, is just ALL_b (that is, bare *will*, not generic *will*). Using these assumptions, along with what we have learned about offering contexts, we will be able to explain why offers can be made with *will* but not with *be going to*.

Consider *be going to*, which by hypothesis is $SOME_t + ALL_b$. $SOME_t$, evaluated at t , w , and p , yields a truth value of 1 just in case p holds over a superinterval t' of t in w , where t is an internal interval of t' . *Be going to* represents a case where p is $ALL_b(d)(q)(w)(t')$ (for some d , q). This means that the worlds *be going to* quantifies over are not just the set of worlds $ALL_b(d)(q)(w)(t)$ quantifies over, i.e., those that are maximally compatible with what d wants at t , but a larger set of worlds: the worlds that are maximally compatible with what d wants for some interval surrounding t .

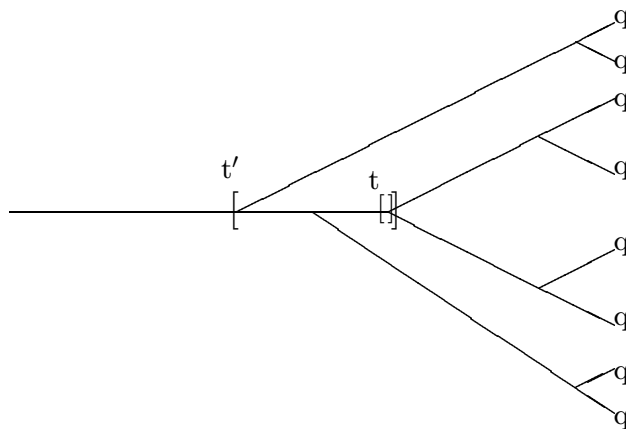
Suppose we depict the differences between these two sets graphically. Let the horizontal line in the diagram below represent the actual world. The lines branching off represent the worlds maximally consistent with what the director wants at the time of branching. If, for some d , q , $ALL_b(d)(q)(w)(t)$ is true, that means that all the worlds branching off during time t are q worlds.

- (166) A case where $\text{ALL}_b(d)(q)(w)(t)$ is true
 (bare future reading of *will*)



Now consider *be going to*. The temporal argument of ALL_b is not t , but some larger interval t' . The worlds quantified over are those that are maximally consistent with what the director wants at the interval t' . We would represent the worlds *be going to* quantifies over as below in (167). If $\llbracket \text{be going to} \rrbracket^g(d)(q)(w)(t)$ is true, that entails that all the worlds pictured branching off during t' are q worlds, as shown.

- (167) A case where $\text{SOME}_t(\text{ALL}_b(d)(q))(w)(t)$ is true
 (progressive future, *be going to*)



Be going to therefore quantifies over not only the worlds that bare *will* would quantify over given the same arguments, but also over additional worlds. The additional worlds are those that branch off during t' but before t (the fact that t is not an initial interval of t' guarantees that there *are* worlds that branch off in t' but before t).

3.2.4 Explaining the puzzle

We are now in a position to return to the puzzle about offering, and explain why the speaker of (163b) (i.e., the billboard *be going to* utterance with the elided antecedent made explicit) cannot also consistently assert (162b), both repeated below in (168).

- (168) a. # If you want us to change your oil in Madera, we're going to change your oil in Madera. (= (163b))
 b. If you don't want us to change your oil in Madera, we won't change your oil in Madera. (= (162b))

Let:

- (169) p = the proposition expressed by *you want us to change your oil in Madera* (in the context in question)
 q = the proposition expressed by *we change your oil in Madera* (in the context in question)
 t = a time non-past with respect to the reading of the billboard

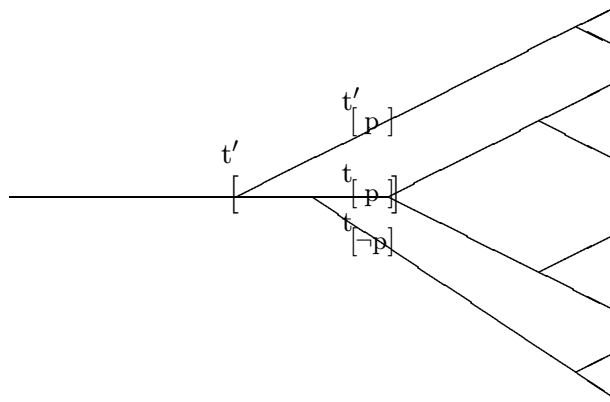
(163b) and (162b), the incompatible utterances from the puzzle, turn out as follows. As far as temporal concerns, let us sidestep the issue and just consider those worlds at which p is true at some time, and call the time at which p is true, t. We will assume that t is also the temporal argument of the consequent. I argued above that offering contexts demand this state of affairs, which is all we need for the time being. We will put off a detailed discussion of the relative temporal interpretation of antecedents and consequents until chapter 4.

- (170) a. $p(w)(t) = 1 \Rightarrow \text{SOME}_t \text{ ALL}_b(d)(q)(w)(t)$ (= (163b))
 b. $\text{not-}p(w)(t) = 1 \Rightarrow \text{ALL}_b(d)(\text{not-}q)(w)(t)$ (= (162b))

Now we will see how the current proposal derives the intuition that (170a) and (170b) are incompatible, solving the puzzle. Suppose now we consider one of the worlds in which p is true at t. We can imagine possible worlds in which p is not true at t (i.e., worlds in which not-p is true at t, assuming contradictory negation, for the sake of simplicity). These worlds branch off before t. Of course, not all of the worlds that branch off before t are

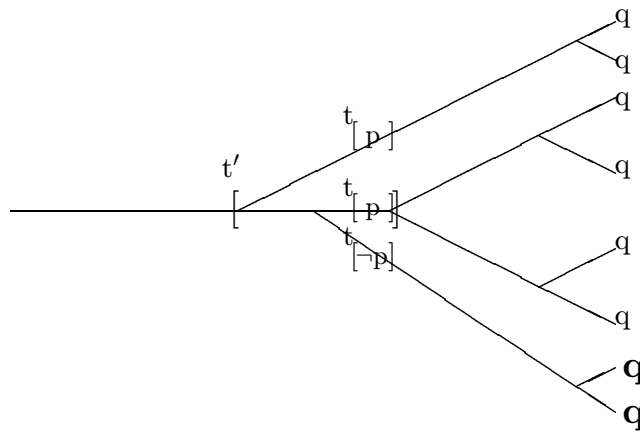
worlds that make not-p true at t; some of the worlds that branch off before t make p true at t. In general, for any interval t' which properly includes t, there will be some worlds that branch off from the actual world during t' such that not-p is true at t. This state of affairs is represented in (171) below.

(171)



Now, let us further suppose that (170a) is true. Therefore on any world that makes p true at t, there is an interval t' such that all the worlds that branch off during t' make q true at some later interval. This state of affairs is given below.

(172)



But now notice that in a situation in which (170) is true — that is, in which there is an interval t' including t such that all worlds branching off during t' have q true at some

later time — there can still be not-*p* worlds among these *q* worlds. Two such worlds in the diagram above are those with boldface, larger *q*. The existence of such worlds is inconsistent with the condition in (170b) that all not-*p* worlds are worlds in which not-*q* will happen (assuming that *q* and not-*q* are inconsistent). That, then, is why *be going to* sentences like the billboard sentence in (158b) can't be used to make an offer. This incompatibility with a condition on offering explains the infelicity of a *be going to* sentence such as (158b) in this context, and is the correct characterization of the puzzle.

That this is the right approach to the puzzle becomes clear when we consider contexts in which not-*p* worlds are assumed to be non-existent. In these contexts, *be going to* sentences suddenly don't sound so rude. Consider, for example, another possible billboard (suppose you are already in Madera):

(173) We're going to make you happy in Madera.

It is safe for the speaker to assume that there are no not-*p* worlds; that is, conceivably there are no possible worlds in which you don't want to be happy. The utterance of (173) doesn't entail that any not-*p* worlds are *q* worlds. Hence no contradiction emerges.

The puzzle we began with, i.e., that *be going to* cannot be used to make an offer, provided empirical support to the proposal that this construction involves two ingredients: progressive aspect and a future modal. Indeed the semantic result of composing these two operators is apparently incompatible with what it means to make an offer.¹³

Thus we have seen that an aspectual difference between *will* and *be going to* can account for modal differences between them. The modal semantics are the same, but because there

¹²It is important that *t* not be an initial subinterval of *t'*; if it were, there would be no difference in the sets of worlds quantified over. I take the temporal output of *SOME_t* to be restricted to realis times, following e.g. a discussion in Abusch (1997).

¹³We know that *will* has a dispositional use. The sentence in (i) has a reading on which what is claimed is not that John, at some point in the future, will eat beans, but rather that he is generally willing or disposed to eat beans. *Be going to* apparently cannot express anything about John's dispositions; (ii) can only be a claim about the future.

(i) John will eat beans.

(ii) John is going to eat beans.

The question that arises at this point is whether the difference between *will* and *be going to* in offering contexts is rather due to the availability of dispositional readings, since plausibly making an offer might have something to do with being willing to follow through on the offer. When we look at languages other than English, as we shortly will in section 3.4.4 below, we discover that such a unified account is actually undesirable.

is a temporal input to the accessibility relation, a difference in aspect means a difference in the set of worlds quantified over by the modal. In this case we saw that a progressive future conditional *If p, q* will typically entail that some not-*p* worlds are *q* worlds, while a bare future conditional will not have such an entailment.

We will have a lot more to say about this mechanism in chapter 4 when we discuss futures in conditionals. For now, let us consider two kinds of interaction between aspect and modality in futures that arise only in past tense futures.

3.3 Aspectual-modal interactions in past futures

Despite the apparently contradictory nature of the terminology, there is such a thing as a “past future” form.¹⁴ This is not a controversial point, but for those unfamiliar with it, I will briefly explain what the term “past future” refers to and why it makes sense.

Like other modals, the modal component of futures *will* takes a temporal input. It is this input that gets modified by aspect, as we have seen. It is also possible to modify the input with tense, as in (174) below. Intuitively, a past tense has the effect of shifting into the past the time at which the branching takes place.

- (174) a. It was going to rain.
b. Andi would become president.

Syntactically, the past and the future morphemes are not competing for the same “slot;” the tense head is located above the future morpheme (Cinque, 1999). (For us, there is an aspectual head between the tense and the aspect.)

Past futures display two contrasts between generic and progressive aspect that are not observable in present tense futures.

3.3.1 Fate-in-hindsight

The first of these contrasts is that unrestricted *would* sentences (which I assume to be generic *would* sentences) entail that the eventuality happened, while unrestricted *was/were*

¹⁴As Ultan (1978) notes, it is particularly common in Indo-European languages, and less common in other language families.

going to sentences do not.

Sentences such as the one in (175) are contradictory, as observed by Binnick (1971a).

- (175) a. This little boy would grow up to be king.
b. # This little boy would grow up to be king, but then he caught pneumonia, and he didn't.

Evidently, the eventuality in question has to have been instantiated by the speech time. In contrast, the example using the past progressive future *was going to* in (176) does not.

- (176) I was going to order the oysters, but then I thought better of it, so I didn't.

To be fair, there is another difference between (175) and (176) aside from aspect. (175) seems to have inertial ordering, while (176) has bouletic ordering. So one might think that the contrast could be due to the ordering difference, rather than the aspectual difference. Indeed, in chapter 2, we saw cases where the director's commitments do not get realized, because of unexpected turns of events. So perhaps it really is a fact about orderings.

However, there are reasons to think otherwise. Many speakers accept sentences such as those in (177), which are inertially ordered but use *was going to*.¹⁵

- (177) a. ? This little boy was going to grow up to be king, but then he got pneumonia and didn't.
b. ? It was going to rain, but then it got colder, and it snowed instead.
c. ? He was going to get well, but then he went out in the cold, and he didn't.

And all speakers accept the sentence in (178).

- (178) The vase was going to fall, but at the last moment I caught it.

To the extent that the inertial examples in (177) and (178) are acceptable, the correct generalization is that past generic futures entail that the eventuality happened, while past progressive futures do not.¹⁶

¹⁵I do not consider bouletically ordered past generic futures here because, as we will see below, they apparently do not exist.

¹⁶Like so many correct generalizations, this one is not quite true. In a situation in which the boy was to be crowned the next day, (175a) could still be felicitously uttered. This fact is reminiscent of past counterfactuals that refer to future events (such as (i)), which are treated at length in Ippolito (2002).

(i) If we had gotten married tomorrow, it would have rained on our wedding.

Let us consider what the current theory should say about these examples. Recall what we had to say about futures in general: they assert that certain facts about the world determine whether *p* happens or not. That is, the set of metaphysically possible futures that agree with certain facts about the current world, all agree on whether *p* is true or not (at some time). Suppose they agree that *p* is true at some time. Then by the definition of direction, it is presupposed that on all the metaphysically accessible worlds, *p* is true at some time.

This definition seems correct for generic past futures. The entailment that *p* has to happen signifies that there are no metaphysically accessible worlds on which *p* does not happen.

For the past progressive futures, that definition does not seem to work; the lack of an entailment that *p* happens means that there are some metaphysically accessible worlds on which *p* does not happen. Therefore, the past progressive future cases do not carry a presupposition that *p* is true at some time on all the metaphysically accessible worlds. At most, they carry a presupposition that *p* is true at some time on a set smaller than (and contained within) the set of all the metaphysically accessible worlds.

It is not clear to me how this smaller set is constructed, or why it is smaller.

3.3.2 No past bouletic generics

Here is another puzzle about past generics. For some reason, only inertial readings are possible with past generics; bouletic readings are not possible. This is the case for both ordinary generics and generic futurates:¹⁷

- (179) a. # Sally handled the mail from Antarctica, but none ever came.
b. # John always left the next day, but he always ended up changing his mind.

This is true of *would* as well, though something like a past bouletic *would* seems to have been possible earlier in the history of the language.

¹⁷Embedded under a higher past operator (Sequence of Tense) these all improve, which is expected if Sequence of Tense past morphology is semantically empty (Ogihara, 1996).

- (180) This little boy would grow up to be king.
- a. inertial: that's what eventually would happen
 - b. # bouletic: that's what he wanted to happen, and it did (?)

However, with progressives, both ongoing and futurate readings are possible with bouletic ordering, as in (181) and (182a) respectively:

(181) Mary was building a house, but she didn't end up finishing it.

- (182) a. The Red Sox were playing the Yankees tomorrow.
b. # The Red Sox were defeating the Yankees tomorrow.

And with *be going to*, the bouletic reading is also possible (and as expected, the inertial reading as well, which entails that the eventuality did happen).

(183) The Red Sox were going to play the Yankees. (ok on both inertial and bouletic readings)

So in general, while a bouletic ordering is available for past progressives, it is not available for past generics. We would thus expect that the latter, but not the former, should be possible in contexts that forbid inertial orderings but allow bouletic orderings. So in such contexts, like bouletic progressive futurates, bouletic progressive futures should be good with eventualities that the director has the ability to bring about, and bad with other eventualities.

One way to rule out the inertial reading is to put a durative temporal adverbial at the beginning of the clause. Bouletic readings, but not inertial readings, can occur with a clause-initial durative adverbial constraining not the time of the eventuality, but the time during which the director was committed to the eventuality's happening. The futurates with clause-initial durative adverbials in (184) exhibit the expected futurate pattern of judgments:

- (184) a. For several days, Nomo was pitching against the Yankees
(next Thursday).
- b. # For several days, Nomo was pitching a perfect game against the
Yankees (next Thursday).

In the next section we change gears to briefly discuss a third reading of *will*: so-called dispositional *will*.

3.4 Dispositional *will*

So far we have been discussing two readings of *will*: a bare (no aspect) reading, and a generic reading. There is a third reading of *will* that has been mentioned in the literature, which we have not yet discussed: dispositional *will*. This use of *will* seems to have a different meaning from the two other *wills* analyzed above. The dispositional reading of (185a) conveys that John is willing to eat beans. (185a) also has a generic reading; this reading is brought out in (185b), which lacks the dispositional meaning.

- (185) a. John will eat beans.
- b. John will eat beans tomorrow.

In this section I will argue that dispositional *will* is a special case of generic *will* with a particular kind of (usually covert) antecedent attaching to ALL_t , and any overt antecedent an argument of ALL_b . Thus it is like generic *will* in some ways and unlike it in others. Data from Indonesian confirms that the generic future and the dispositional future do not always travel together.

3.4.1 Genericity in dispositional *will*

Like generic *will*, dispositional *will* can take present input, indicating that it is +SIP (has the subinterval property). It also permits generic readings of indefinite subjects, indicating that that temporal quantifier is ALL_b .

Embedding under *I can't believe (that)* is fine, showing that a present temporal input is possible, and therefore, that dispositional *will* is +SIP.

(186) I can't believe Mary will eat beans these days!

Dispositional *will* also need not be embedded.

(187) Mary will eat beans these days.

These facts make sense only if either $SOME_t$ or ALL_t is in the denotation. It's actually ALL_t and here's why. As we saw above in section 3.1.2.2, ALL_t , but not $SOME_t$, licenses generic readings of bare plural subjects. Consider the sentence with a bare plural subject in (188):

(188) Dogs will eat doughnuts.

There are three readings of this sentence. The bare *will* reading, as we expect, says that there will be an instance of some dogs eating doughnuts. The bare plural can only get an existential reading on the bare *will* reading. The generic *will* reading, which we have also seen, says that in general, dogs will, every now and then, eat doughnuts, and there's no way to stop them. It seems to be false; I know of no dog who goes around eating doughnuts. On the other hand, the dispositional *will* reading says something along the lines of, if you give a dog a doughnut, it will eat it. That is quite different from the generic reading, and I think true (though I haven't tried it). But as in the generic *will* reading, the bare plural gets a generic reading with dispositional *will*. This allows us to conclude that ALL_t is a component of dispositional *will*.

3.4.2 Dissimilarities with generic *will*

There are, in fact, a number of differences between generic *will* and dispositional *will*.

First, the covert *if you give it to them* that seems obligatory on dispositional *will* is important. Also, as I said above, dispositional *will* is incompatible with anything that marks a specific eventuality, as in (189), although in such a case, a generic *will* reading is allowed:

(189) John will eat beans tomorrow.

This is perhaps related to the fact that (190) on the generic reading can have either an existential or universal subject (Carlson, 1995), but the existential one is much better with the adverbial.

(190) Dogs will eat doughnuts (tomorrow).

I have no explanation for this fact, but it is suggestive.

We might expect that something called “dispositional” might be impossible with inanimate subjects. This is not so, but the facts around inanimate subjects in dispositional *will* point to another difference between dispositional and generic *will*. Inanimate subjects are fine with dispositional *will* as well as generic *will*, but the dispositional part has to do with non-accidental properties of the subject, as in (191a). The sentence in (191a) is true or false in part because of properties of hydrangeas. However, I can utter the generic *will* sentence in (191b) as a prediction, and its truth conditions have nothing to do with any inherent properties of hydrangeas. If I know that aliens will land and plant hydrangeas next spring here and keep them alive with special techniques, I would still be able to utter (191b) in good faith.

- (191) a. Hydrangeas will grow to a height of 5 ft. in this area.
b. Hydrangeas will grow here next spring.

Dispositional *will* is even compatible with passives, as long as the eventuality’s happening depends on a non-accidental property of the subject

(192) Chocolate cakes will be eaten (if you just leave them lying around).

So while dispositional *will* does not require an animate subject or agent, it still differs from generic *will* in that the inherent, non-accidental properties of an inanimate subject must entail that the eventuality will happen.

3.4.3 Hypothesis

The facts to be explained about the meaning of dispositional *will* are as follows:

- Why does it allow generic readings of indefinites?
- Why the covert *if*-clause?
- Why subject-bouletic or subject-inherent properties?

The possibility for generic readings of indefinites means there is a high generic operator, i.e., ALL_t .

The need for a hedge — *if you offer, if you let them, if the conditions permit it* — is missing from any other future we have talked about so far.

Let's say this antecedent has an existential bouletic-inertial modal $SOME_b$, a modal of permission, modelled on ALL_b . The director is the world or an animate entity; which one it is can be detected by what the hedge is.

What about the consequent? Perhaps, in all situations overlapping the present in which it is permitted (by some higher power) for the subject to do q , the subject does q . But this is not quite right. There is nothing here so far about the dispositions, or inherent properties, of the subject. The fact that we are talking about dispositions and inherent properties suggests that a bouletic-inertial modal phrase is in the consequent as well. The subject, if animate, gets to choose whether to do q or not. If inanimate, non-accidental properties do the “choosing”.

If we were to redefine ALL_t to take two propositional arguments, we informally get the following meaning for dispositional *will*:

(193) In all times (situations) in which it is permitted by d that d' (the subject of q) directs q , d' wants q .

Presupposed: d directs whether d' directs q .

The meaning given above is a preliminary hypothesis. There are a number of questions that would have to be answered in a more complete account; why the lower director has to be the subject¹⁸, for instance, and how the complex direction presupposition is calculated.

¹⁸The fact that the lower director has to be the subject constitutes more evidence that directors are (sometimes) visible to the syntax.

Nevertheless, this discussion demonstrates how useful the notion of direction may be in sorting out the meaning of modals. The fact that dispositional *will* appears to have two directors sets it clearly apart from generic *will*.¹⁹

3.4.4 Facts from Indonesian

In Indonesian, neither *akan* (a bare future) nor *mau* (a progressive future) are really felicitous in generics or conditionals, an interesting fact in itself. Yet *mau* has dispositional readings. Calling *mau* a progressive future is based on the fact that *akan* can be used to make an offer, and *mau* cannot.

- (194) a. Saya akan membuat kopi.
 woll make coffee
 ‘I’ll make coffee.’ offer ok
- b. Saya mau membuat kopi.
 be going to make coffee
 ‘I’m going to make coffee.’ #offer

Also, *mau* can have present input, while *akan* cannot:

- (195) a. # Aduh, akan hujan.
 Oh.look woll rain
 ‘Oh look, it’ll rain’
- b. Aduh, mau hujan.
 Oh.look, be going to rain
 ‘Oh, it’s going to rain.’

In these respects it appears that *akan* is much like *will* (*woll*, really, since there is no present tense marked in Indonesian) and *mau* is much like *be going to*. However, when we turn to the possibility of dispositional uses, the situation is reversed. It is *mau* that has a dispositional use, not *akan*.

¹⁹I anticipate some interesting difficulties in setting dispositional *will* apart from the *can* of ability, however.

- (196) a. Ali akan makan ikan.
 Ali woll eat fish
 ‘Ali will eat fish (later)’
 *‘Ali is willing to eat fish.’
- b. Ali mau makan ikan.
 Ali be going to eat fish
 ‘Ali is going to eat fish.’
 ‘Ali is willing to eat fish.’

Thus generic and dispositional futures are not the same thing, supporting the analysis given above. In Indonesian, the question that arises now is whether the Indonesian dispositional *mau* is generic or progressive; later research will answer this question.

3.5 Conclusion

In this chapter I have introduced a semantic classification of future morphemes into progressive, generic, and bare futures. Aspect was shown to have detectable effects on the worlds quantified over, as well as on the ordering source used. We have seen, to some extent, how futures differ from futurates, but they have a number of similarities: an aspectual operator and a modal with bouletic or inertial ordering.

In chapter 4, we will consider how futures and, to some extent, futurates behave in conditionals.

Chapter 4

Conditionals

Âs cōusas mudárão dê aspécto.
The things have changed to aspect.

-José da Fonseca and Pedro Carolino
English as She Is Spoke, 1855

In the previous two chapters, we began an investigation of the semantics of futurates, as in (197a,b), and futures, as in (197c,d):

- (197) a. Devon is leaving tomorrow.
b. Devon leaves tomorrow.
c. Devon is going to leave tomorrow.
d. Devon will leave tomorrow.

We did not go into much detail regarding interactions between the semantics of conditionals and the proposed denotations of futures and futurates. In this chapter we will examine more closely the behavior of futures and futurates in conditionals. In particular, we will find that their behavior will allow us to determine the scope of pronounced and unpronounced modals in conditionals.

I argued in chapters 2 and 3 that variations on a universal bouletic-inertial modal, termed ALL_b , is involved in futures and futurates. This modal allows both bouletic and inertial ordering sources, and has a “direction presupposition” to the effect that either an

animate entity (in the case of bouletic orderings) or certain facts about the world (in the case of inertial ordering) determine what happens in the future.

I further argued that GEN and generic *will* had an aspectual element in common, ALL_t, and that PROG and *be going to* had an aspectual element in common as well, SOME_t, which in all cases scopes over the bouletic-inertial modal. I claimed there was a lower operator constraining the time of the eventuality to be in the future (this operator was absent in ongoing readings of PROG and GEN sentences).¹

The questions that will dominate this chapter concern how to modify the proposed semantics in order to account for the semantics of conditionals containing futures and futurates, and in particular, effects of aspect on the set of worlds quantified over and the entailments of the conditional. We have seen some of these effects in chapter 3, in contexts of offering where bare *will* is possible, but *be going to* is not possible, as in the case of the appropriateness of (198a) as an offering on a billboard, and the inappropriateness of (198b).

- (198) a. We'll change your oil in Madera.
b. # We're going to change your oil in Madera.

The sentence in (198b) is rude in an offering context, I said, because it entails that the speaker believes that in some worlds in which the hearer does not want their oil changed, the speaker will change their oil anyway. I explained this effect by means of a conditional account of offering. Offering commits the offerer to the proposition in (199), where p is the proposition that the hearer wants q, but the *be going to* sentence entails the proposition in (200). It is because these are incompatible that the *be going to* sentence in (198b) cannot be used in that context.

(199) All not-p worlds are not-q worlds

(200) Some not-p worlds are q worlds

In the explanation I gave for this effect, I used two crucial assumptions:

¹In what follows, we will set aside the third reading of *will* that was discussed, dispositional *will*.

- (201) a. The highest predicate in *be going to*, which is interpreted in the consequent of the conditional, has the subinterval property (is +SIP)
- b. The time when it matters whether the hearer wants *q* or not, is the same as the time when the offerer is prepared to undertake *q*

I will not review here the mechanism that depended on these assumptions, which can be found in chapter 3, section 3.3. It is important to note that there is nothing about the semantics of conditionals that conflicts with *be going to*; in (202a) we see one such felicitous conditional.

- (202) a. If the clouds get heavy enough, it's going to snow.
- b. If the clouds get heavy enough, it'll snow.

In fact, if we compare (202a) with (202b), they seem to have quite similar meanings. Rather, what caused the conflict was the pragmatic requirements on felicitous acts of offering. And indeed, when we consider various other contexts in which conditionals occur, differences between *be going to* and the bare future show up that are reminiscent of the differences in offering contexts. As with the mechanism proposed in chapter 3, aspect affects which worlds are quantified over, influencing the entailments. Let's call the proposition in (200), that some not-*p* worlds are *q* worlds, the *SIP entailment*.

Here we will look at other conditionals, some that have the SIP entailment and some that do not; these will help us put the assumptions in (201) in a more general form, and thereby determine the logical forms of various different kinds of conditionals.

We will need to make some starting assumptions about the structure of conditionals. I assume, following Kratzer (1986); Stalnaker (1968); Barwise and Cooper (1981) and many others, that they are modal in nature; that is, they involve quantification over possible worlds or situations.² I assume nothing else special about the semantics of conditionals; i.e., there is no additional meaning stemming from the fact that a conditional is a conditional, other than what stems from its modal quantifier. Quantifiers in general I assume to have

²This includes our aspectual quantifiers ALL_t and SOME_t, since, as we have said, they properly ought to be situational rather than temporal quantifiers, in order to account for the distribution of generic readings.

a tripartite structure, taking two propositional arguments which are referred to as the restrictor and the nuclear scope respectively³

In a conditional, the *if*-clause restricts a modal.⁴ However, conditionals may have several, often null, modal quantifiers, so it will not typically be obvious which modal the *if*-clause restricts (this modal we will term the “conditional modal”). If it is pronounced at all, the conditional modal is always in the consequent in English, but it will become clear that not every modal that appears in a consequent is the conditional modal. For the most part, we will not be investigating modals in the antecedent, though those certainly occur as well.

Careful consideration of the truth and assertability conditions of each conditional will be vital to determining where the overt modals are interpreted and what, if any, covert modals are present. The results we have obtained so far will be helpful in this regard. In particular, the presence or absence of the SIP entailment will indicate whether the highest predicate interpreted inside the consequent is +SIP or not.

The discussion will lead us to the finding that different kinds of conditional modals put different temporal requirements on their antecedent and consequent. In one kind of modal (epistemic) each clause takes a present temporal input, and in another kind of modal (metaphysical, e.g. ALL_b) the temporal input of the consequent depends on the temporal location of the antecedent in a particular way. Thus we will be in place to develop not only a theory of the logical forms of conditionals, but also a theory of how temporal considerations are to be integrated into theories of modality.

In section 4.1, I present conditional data that supports the main result of chapter 3: +SIP consequents trigger the SIP entailment that some not-*p* worlds are *q* worlds. Unexpectedly, however, certain *be going to* conditionals — those in which *be going to* has a -SIP complement — can lack the SIP entailment.⁵

The reason, I suggest, is that in these cases the +SIP aspectual element SOME_t is interpreted outside the conditional, making the highest predicate interpreted in the conse-

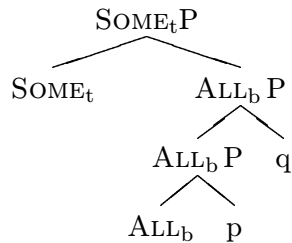
³It is well-known that the apparent structure of conditionals as determined by syntactic means is in conflict with the logical form needed for modals. See von Stechow (1995), among others, for discussion. I will not deal with that issue here.

⁴Note that the modal denotations given in chapters 2 and 3 only take one propositional argument, the nuclear scope, so they will need to be modified to take a restrictor as well.

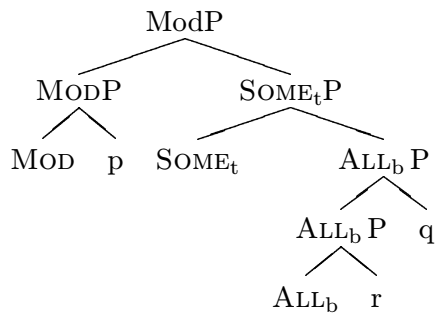
⁵Generic *will*, because it is morphologically identical to bare *will*, turns out to be less useful in this discussion; some of the same facts hold as hold for *be going to*, but the picture is far less clear.

quent -SIP, so that there is no SIP entailment. In these cases, ALL_b is interpreted as the conditional modal. In general, the presence or absence of the SIP entailment can provide evidence about the relative scope of modals in conditionals, whether they have wide scope (interpreted as the conditional modal) or narrow scope (interpreted in the consequent), as below.

(203) Wide *be going to* conditional



(204) Narrow *be going to* conditional



Considering the possibility for modals to be interpreted outside of the consequent, it makes sense to ask whether in such a case, a +SIP complement remaining in the consequent triggers the SIP entailment. The answer to this question seems to be yes. Up to this point we have only used -SIP verb phrases under modals, but in section 4.2, we find that wide scope *be going to* conditionals, when the complement of *be going to* is +SIP, again have an SIP entailment. We can then refine our scope test from the previous section to reflect this sensitivity to the SIP value of the modal complement (the “complement SIP effect”). The complement SIP effect is observed with bare *will* as well; I discuss some ramifications of that fact.

Section 4.3 is concerned with modeling the complement SIP effect formally. First, I ask whether the same mechanism developed in chapter 3 to explain the SIP entailment for +SIP modal $SOME_t$ in *be going to* could be used to explain it for lower +SIP predicates. I

demonstrate that the mechanism will work if certain times in the antecedent and consequent have a certain relation, and elucidate what would have to be true about temporal interpretation in conditionals for that relation to hold. I present two lemmas about temporal interpretation in two different kinds of conditionals, epistemic conditionals (those in which an epistemic operator such as null EP is restricted by the *if*-clause), and bouletic-inertial conditionals (in which a bouletic-inertial modal such as ALL_b is restricted by the *if*-clause). It is demonstrated that these two cases involve different temporal interpretation, but that in either case, the mechanism from chapter 3 will work for lower +SIP predicates. Formal details are presented.

Section 4.4 presents an unexplained fact about temporal interpretation in narrow scope *be going to* conditionals, and the chapter concludes with section 4.5.

4.1 Conditional contexts

Recall that in chapter 3, our original discussion of the SIP entailment arose out of a discussion of conditionals in offering contexts. In this section we will look at two other contexts besides offering that allow us to detect the SIP entailment, and see how different futures and futurates behave in conditionals in those contexts. Throughout this section, we will consider only examples in which the modal complements are -SIP. The results are, for the most part, compatible with the results of chapter 3. However, there are some anomalous *be going to* and generic *will* cases. These, I will argue, are cases in which the modal, along with its +SIP aspectual component, is interpreted outside of the consequent.

Sections 4.1.1 and 4.1.2 look at conditionals that have futures with -SIP complements. Relevance conditionals, I will show in section 4.1.1, require that all not-p worlds are q-worlds, which is compatible with the SIP entailment (that some not-p worlds are q worlds). +SIP futures (generic *will* and *be going to*) are, as predicted, felicitous in relevance conditionals. Unexpectedly, bare *will* is bad although there is no conflict with the relevance requirement; I propose that the source of the conflict is not a modal conflict induced by aspect, but actually an aspectual conflict with the present -SIP constraint. In section 4.1.2, I show that conditionals in indication contexts (those in which the truth of the antecedent is asserted to be an indication of the truth of the consequent) require that some not-p worlds are q worlds

(echoing the SIP entailment). Again *be going to* and generic *will*, which we expect to have the SIP entailment, are good; again we have a question about why bare *will* is not. Indication contexts are contrasted with causal contexts, which, like offering, are demonstrated to require that all not-p worlds are not-q worlds. This raises a further question about why in causal contexts *be going to* and generic *will* are possible. This question is subsequently sharpened, in 4.1.3, where I propose that in these cases, the aspectual-modal operators are interpreted outside of the consequent. Evidence is given for this proposal, and I ask whether the remaining material interpreted in the consequent can trigger the SIP entailment in cases where the modal has wide scope.

4.1.1 Relevance conditionals

Relevance conditionals are conditionals in which the antecedent seems to be a condition on the relevance to the hearer of the information in the consequent. Two examples of relevance conditionals are given in (205).

- (205) a. If you want to know, there's some beer in the fridge.
 b. If I may be frank, Frank is not looking good.

Differently from some other contexts for conditional utterances, the speaker of a relevance conditional *If p, q* cannot perfect the conditional (see von Stechow (1999) for a detailed discussion of conditional perfection). For example, in the context of a promise, as in (206a), $\neg p \rightarrow \neg q$ is typically implicated, as in (206b), though that implicature can be cancelled, as in (207).

- (206) a. If you mow the lawn, I'll give you ten dollars.
 b. If you don't mow the lawn, I won't give you ten dollars.
 (207) If you mow the lawn, I'll give you ten dollars. And come to think of it, I'll give you ten dollars anyway.

Again, there is nothing about the semantics of a conditional that has anything to say about what happens in cases in which not-p is true. It is the kind of speech act being made, that bears on the question of whether the not-p worlds are all q worlds, all not-q worlds, or some combination of q and not-q worlds.

In any case, what interests us here is that relevance contexts do not allow perfection of the conditional; for example, the speaker of (205a) is not committed to (208a), nor is the speaker of (205b) committed to (208b).

- (208) a. If you don't want to know, there is no beer in the fridge.
 b. If I may not be frank, Frank is looking good.

Therefore, in the context in which a relevance conditional *If p, q* is truthfully uttered, not all not-p worlds are not-q worlds. That is, some not-p worlds are q worlds. But actually, a stronger entailment can be demonstrated; namely, that all not-p worlds are q worlds. Iatridou (1994) notes that relevance conditionals are not possible with *then*:

- (209) a. If you're interested, (#then) there's some beer in the fridge.
 b. If I may be frank, (#then) Frank is not looking good.

Iatridou argues that the use of *then* in a conditional *If p, q* presupposes that not all not-p worlds are q worlds. If this is so, the impossibility of adding *then* to a relevance conditional *If p, q* points to a requirement that all not-p worlds be q worlds.

Recall that, on the proposal I am making, a *be going to* statement has an SIP entailment: It entails that some not-p worlds are q worlds — namely those worlds consistent with the director's commitments in *w* at *t'*, but before the time at which *p*. Thus I predict that *be going to* should be possible in the consequent of relevance conditionals, since if all not-p worlds are q worlds, some not-p worlds are q worlds. The prediction is borne out. While the conditional in (210a), using *will*, is not a good relevance conditional (but makes a fine offer), the conditional in (210b), using *be going to*, is a good relevance conditional (and as expected, is not a good offer).

- (210) a. If you want to know, we'll go get some beer. #relevance, √offer
 b. If you want to know, we're going to go get some beer. √relevance, #offer

So we can explain (210b). But what about (210a)? Nothing about bare *will* should prohibit it. It's true that bare *will* has no SIP entailment, but in fact it carries no entailment whatsoever about the not-p worlds. So it should also be compatible with relevance contexts,

in which all not-*p* worlds are supposed to be *q*-worlds, because it is silent on the subject of not-*p* worlds.

Of course some *will* clauses are good in the consequent of relevance conditionals.

- (211) a. If you really want to know, John will win.
b. If you really want to know, this comet will next be visible in 52 years.

I take these to be generic *will*.

Let's leave this question for now and look at two other contexts for conditionals, one compatible with the SIP entailment (indication contexts), and one incompatible with it (causal contexts). The same question about bare *will* arises: Why is it impossible in contexts that are compatible with the SIP entailment? An additional question arises about +SIP futures in contexts incompatible with the SIP entailment, that will have some bearing on our theory of the logical form of these conditionals.

4.1.2 Indication and causal contexts

We have just seen that relevance conditionals allow *be going to* and generic *will*; aspect influences the accessibility relation in such a way as to trigger the SIP entailment that some not-*p* worlds are *q* worlds. In this section we will consider conditionals that can occur in both indication and causal contexts; those in which the antecedent can either be the cause of the consequent, or merely an indication that the consequent will occur. These results raise another question (in addition to the question raised above about bare *will*, which will come up again).

For instance, suppose you are babysitting an infant who has an upset stomach. Her father might say one of the following in his instructions to you:

- (212) If the baby cries...
a. ...she'll spit up.
b. ...she's going to spit up.

If the father says (212a), what he means is that her crying will cause her to spit up. He might follow up with, "So try to keep her from crying." If he instead says (212b), he could mean either that her crying will cause her to spit up, or that her crying will inform you that

her stomach is upset enough that she will spit up. In the latter case, soothing her crying will not be expected to have any effect on whether she eventually spits up. It is difficult, if not impossible, to use (212a) in that context.⁶

The example in (213) rules out the indication context (because something you do yourself is not likely to be an indication to you of some other eventuality); thus we can see clearly that *be going to* is possible in the cause context.

(213) If you hold the baby horizontally, she's going to spit up.

Or suppose that you are going to talk to an eccentric professor who you have never met with. Another student tells you what to expect ahead of time by saying one of the following:

(214) If he hits his forehead with his hand. . .

a. . .he will tell you something important.

b. . .he's going to tell you something important.

If your fellow student says (214a), it might be rational, though perhaps not advisable, to contrive some way to make the professor hit his forehead, because in that case he will inevitably tell you something important! If your friend says (214b), however, you would probably not take that course of action; though it has that reading, the more sensible reading is possible as well.

As we did with (213), we can verify the intuition that the causal context is possible with *be going to* by using a conditional that is only possible in a causal context. Indeed, it is felicitous.

(215) If you hit his forehead with your hand, he's going to tell you something important.

What causes the difference between *be going to* and *will* (presumably bare *will*) in indication contexts?

Remember that in the consequent of a conditional, generic *will* and *be going to* were seen to have the SIP entailment, because of their their +SIP operators, but bare *will* does not because it has no +SIP operator. As we did for offering and relevance contexts, let's try to determine what indication and causal contexts entail for the not-p worlds.

⁶Though some speakers can. I believe that they are getting the generic *will* reading. It is not clear to me, though, why other people would find generic *will* harder to get.

Suppose *p* is a cause for *q*. What can we say about the worlds in which not-*p* happens? There are two possible moves we could make here. We could say that *p* is the only cause for *q*, so that if *p* doesn't happen, *q* doesn't happen either, or we could say that *q* might have other causes, so that if *p* doesn't happen, *q* might still happen.

While it is indeed often the case that an eventuality can logically have a number of different possible causes, in a particular situation, a not-*p* world should be a not-*q* world, all else being equal.

- (216) a. If you strike this match, it will light.
b. If you hadn't struck this match, it wouldn't have lit.

(216a) does entail (216b) if the context is not changed (von Fintel, 1999).

Thus the condition on causes we want is the following.

- (217) *Cause condition.*
If *p* causes *q*, all not-*p* worlds are not-*q* worlds

Note that it is not compatible with the SIP entailment that some not-*p* worlds are *q* worlds.

Now, indications. If it is the case that *p* indicates but does not cause *q*, it does not follow that if *p* had not happened, *q* would not have happened.

- (218) a. If the dogs run around in circles, it's going to snow.
b. If the dogs hadn't run around in circles, it wouldn't have snowed.

In the current proposal, we might say that *p* and *q* share a common cause *c*, and that *c* is not a compelling cause of *p*, but is a compelling cause of *q*. So in a world where *c* has occurred, *p* occurs on some inertial worlds, and *q* occurs on all inertial worlds. If *p* happens, we can assume that *c* has happened (supposing that the cause condition in (217) applies to non-compelling causes as well as compelling causes). Therefore, since *c* is a compelling cause for *q*, *q* will happen. However, if *p* does not happen, that is not evidence that *c* did not happen, hence, it is not evidence that *q* will not happen. So:

(219) *Indication condition.* If p is an indication of q , some not- p worlds are q -worlds

Unlike the cause condition, the indication condition is compatible with the SIP entailment (in fact, it is the SIP entailment). Thus we predict that the +SIP futures should be possible in indication contexts but not in cause contexts, and that bare *will* should be possible in both, because it says nothing about not- p worlds.

The prediction that *be going to* should be possible in indication contexts is thus borne out, as is the prediction that bare *will* is possible in cause contexts.

However, bare *will* is unexpectedly impossible in indication contexts; again, we cannot so far explain why it should be ruled out in a context compatible with the SIP entailment. Furthermore, *be going to* is unexpectedly possible in causal contexts. Why is it possible to say *If the baby cries, she's going to spit up* in the context in which her crying actually causes her to spit up? If *be going to* conditionals really entail that there are some not- p worlds that are q worlds, we are at a loss to explain why they can appear when apparently there are no not- p worlds that are q worlds.

4.1.3 Wide scope *be going to*

So why are the bare *will* sentences we have seen unexpectedly unacceptable in relevance and indication contexts? And why are the +SIP futures, generic *will* and the progressive future *be going to*, unexpectedly acceptable in causal contexts? Continuing to leave aside the first question for now, let's articulate the second question, which will then put us in a position to further investigate the first.

We saw above that *be going to* can be used in such a way as to avoid violating the cause condition. This was unexpected. The cause condition, we said, has a requirement that is similar to one in the offering condition – namely, that all not- p worlds are not- q worlds — that conflicted with the SIP entailment. And in chapter 3 we saw that *be going to* conditionals do not make good offers. Given that *be going to* conditionals can avoid violating the cause condition, we would expect them to also be able to violate the offering condition.

We did not look hard enough in chapter 3 for such violations. It turns out we can, after all, use *be going to* as an offer, provided that the context is carefully chosen:

(220) *Be going to* used to make an offer:

We're going to take good care of you before your defense. If you want a manicure, we're going to give you a manicure. If you want an oil change, we're going to change your oil.

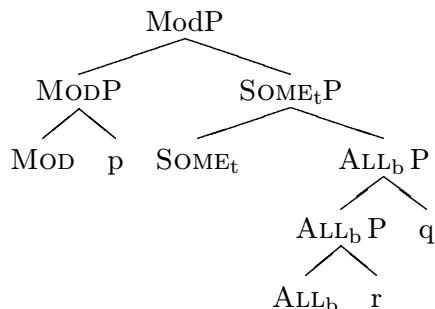
These conditionals do present the manicure and the oil change as contingent on the hearer's desires. There still is something that does not depend on the hearer's desires; what is not negotiable in (220) is the idea that the speaker is going to take care of the hearer.

Many speakers I have consulted with have an intuition that in these offering examples, as well as in the cause context, *be going to* is taking wide scope, over the entire conditional. In the offering example, what's going to happen is this: you want a manicure, we give you a manicure. In the cause example, what's going to happen is this: you hold the baby horizontally, she spits up. Thus *be going to* has two readings: this wide scope reading, and the narrow scope reading we looked at before. The narrow scope reading is the one triggers the SIP entailment; the wide scope reading does not.

In chapter 3 I gave the explanation for the SIP entailment in what we now are calling the narrow scope reading. But there we did not attempt to give an account of the semantics of an entire offering conditional; we only considered an arbitrary p world, without saying which modal was the conditional modal, quantifying over all the p worlds.

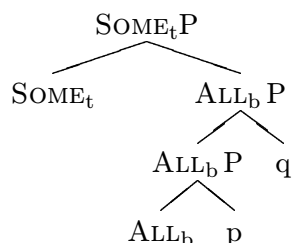
In any case, however, the conditional modal wasn't the ALL_b in *be going to*. That modal that had to be under $SOME_t$ the +SIP element of *be going to*, $SOME_t$. $SOME_t$ in turn had to be interpreted in the consequent in order to get the mechanism to work. The conditional modal, then, was not the ALL_b in *be going to*, but was some higher null modal, as shown in (221).

(221) Narrow *be going to* conditional



In the wide scope reading, of *be going to*, we have seen that the SIP entailment is absent, as shown by its acceptability in cause and offering contexts. The intuition that *be going to* (and thus ALL_b) somehow scopes over the antecedent as well as the consequent amounts to an intuition that SOME_t and ALL_b are interpreted outside of the consequent, seemingly with ALL_b as the conditional modal (and SOME_t higher than it, as usual).

(222) Wide *be going to* conditional



With this configuration, we do not expect to get the SIP entailment, since in these cases at least, there is no +SIP predicate left in the consequent. With the aspectual semantics removed from the conditional, the sentence no longer makes any claim about not-p worlds. Therefore, there is no conflict with the cause condition or the offering condition.

For more evidence that we are on the right track, we turn first to Turkish. Turkish has a morpheme traditionally called the Future, which, I proposed in chapter 3, is a progressive future. By itself, the Future can only get a cause context (i.e., no SIP entailment), not an indication context. However, with an additional, higher modal, the indication context is perfectly acceptable:

- (223) a. Bebek ağla-r-sa, kus-acak.
 Baby cry-aor-cond, throw.up-fut.
 ‘If the baby cries, she’s going to throw up.’ √cause, #indication
- b. Bebek ağla-r-sa, kus-acak-tir.
 Baby cry-aor-cond, throw.up-fut-modal
 ‘If the baby cries, she’s going to throw up.’ #cause, √indication

I am proposing something similar for English, except that in English, the conditional modal used in indication contexts is not pronounced, while in Turkish it is.

English itself provides another source of evidence that there is a wide scope reading of *be going to* as well as a narrow scope reading; the data has to do with *already*.

Already requires a +SIP complement (Michaelis, 1996). Thus if it is in a position to take $SOME_t$ as its complement, the sentence should be felicitous. But if $SOME_t$ is interpreted higher than *already*, and there is nothing else +SIP under *already*, the sentence should not be felicitous. Thus with *already* in the right position, we expect the indication reading of (224a) to be possible, but the cause reading to be impossible, because the cause reading permits only wide scope *be going to*. This seems to be so. The judgment is confirmed by the infelicity of (224b), which rules out the indication reading. With *already*, no reading is available at all, as predicted.⁷

- (224) a. If the baby cries, she's already going to spit up. indication, #cause
 b. # If you hold the baby horizontally, she's already going to spit up.

So there is some initial support for an analysis of *be going to* conditionals as having two readings: one in which *be going to* takes narrow scope over just the consequent, and one in which it takes wide scope over the entire conditional.

So far: We have noted that relevance and indication contexts permit conditionals with the progressive future (*be going to*). This is expected according to the mechanism developed in chapter 3, because these futures trigger SIP entailments, which are compatible with relevance and indication contexts. However, we also saw causal and offering cases in which progressive and generic futures are possible in contexts that are incompatible with the SIP entailment. I suggested that in these cases the +SIP component ($SOME_t$ or ALL_t) is interpreted outside the consequent and provided evidence that this is so.

In the next section we will answer a question raised by this section. The question is as follows. If, as I have argued, in wide scope +SIP future conditionals, the +SIP element of the future (either ALL_t or $SOME_t$) is not interpreted in the consequent, and if the SIP entailment is triggered by +SIP consequents, should a +SIP main verb in the consequent of such a conditional trigger the SIP entailment after all? We will see that it does, and extend the analysis to explain why.

We will also have more to say about bare *will*. Recall that it was unexpectedly bad in contexts compatible with the SIP entailment; this was unexpected because bare *will*

⁷It would be nice if we could use *already* to test for generic vs. bare *will* in a similar way, but *already* seems to be unable to be high enough.

apparently has no entailments that would be incompatible with such contexts. In section 4.2, I will suggest that something strictly aspectual is going on, as opposed to aspectual effects on the accessibility relation, since a +SIP complement seems to improve the bare *will* cases.

4.2 Main verbs and the complement SIP effect

To take stock of where we are, recall our question about wide scope readings of the +SIP future *be going to*. We saw that with -SIP main verbs they lack the SIP entailment. This was attributed to the +SIP element in the denotation of the future being interpreted not in the consequent, but outside it. The question was then asked whether wide +SIP futures should regain the SIP entailment when there was still something +SIP left in the consequent.

The answer appears to be yes. With a +SIP predicate under the modal, and the modal interpreted wide, the SIP entailment returns. This pattern where the complement of the modal matters — SIP entailment with +SIP complements, no SIP entailment with -SIP complements — I will call the *complement SIP effect*. The complement SIP effect, we will see, occurs with wide *be going to*, and also with bare *will*. I was alluding to this fact when I hinted earlier that a discussion of wide *be going to* would be useful in articulating our outstanding question about bare *will*; in section 4.2.2.2 I will say something about this question.

Now let's look at the data. We will first try wide and narrow *be going to* in the different contexts, with phrases with different SIP values in the complement of *be going to*.⁸ Throughout, the reader will observe that -SIP complements behave one way; the progressive complements, which are +SIP, behave the opposite way; and lexical statives seem, at first blush, to be able to behave either way.

This permissive behavior of lexical statives will deserve a word of explanation. I attribute it to their ability to be either +SIP or, with the help of an embedding -SIP predicate, -SIP. We will use *already* to disambiguate +SIP and -SIP readings of lexical statives. We will

⁸We could have used generic complements as well here, but their lack of morphology, and the difficulty of setting up the appropriate contexts, makes them difficult enough to distinguish from perfectives that I judged it not worth the trouble.

continue to use *already* to discriminate between wide scope and narrow scope *be going to* as well; the difference between the two tests is in where we put *already*.

4.2.1 Wide *be going to* has the complement SIP effect

Recall that wide *be going to* with an eventive complement was unexpectedly good in offering contexts. Here we will see that that effect disappears where wide *be going to* has a +SIP complement.

Compare, for instance, the three examples in (225). The fact that *already* is infelicitous in the position before *going* confirms that we are dealing with wide *be going to* throughout, as desired, excluding narrow *be going to*.) Eventives and lexical statives are good as offers, but progressives are not, with or without *already*.

(225) Offering: wide *be going to* has complement SIP effect

- a. We're going to take good care of you the week before you defend. If you want an oil change, we're (#already) going to change your oil. If you want a manicure, we're (#already) going to give you a manicure.
- b. We are going to take good care of you the week before you defend. If you want us to be enforcers to make sure you get everything done, we're #already going to be enforcers. If you want us to be enablers to make sure you get enough chocolate to eat, we're (#already) going to be enablers.
- c. We are going to take good care of you after your defense. We plan to start the preparations the minute you go into your defense. At the moment when your committee says, "Congratulations," we will already be in action. #If you want us to decorate your office, we are (already) going to be decorating your office. #If you want us to call everyone you know to invite them, we are (already) going to be calling everyone you know to invite them.

If we take the judgment in (225b) at face value, there is a conflict with our expectations. We expected to get the SIP entailment that some not-p worlds are q worlds, and therefore a judgment of unacceptability, with +SIP complements. But the lexical stative in (225b) is acceptable, therefore it must not have the SIP entailment.

However, this result is misleading. Lexical statives can get inchoative readings as well as ongoing readings in English. The sentence in (226) can either convey that Joe was already there at 6, or that Joe got home at 6.

(226) Joe was home at 6.

The inchoative construal is, I presume, -SIP.⁹ To find out if the reading of the lexical stative in (225b) is +SIP or not, let's put *already*, which as we saw requires a +SIP complement, just above it, as in (227).

(227) We are going to take good care of you the week before you defend. If you want us to be enforcers to make sure you get everything done, we're going to (#already) be enforcers. If you want us to be enablers to make sure you get enough chocolate to eat, we're going to (#already) be enablers.

The addition of *already* forces the +SIP reading of the stative and triggers the SIP entailment, which makes the sentences infelicitous as offers. Thus our expectation was correct after all: Only -SIP complements permit the offer reading with wide scope *be going to*.¹⁰ Wide scope *be going to* has the complement SIP effect.

Narrow *be going to*, on the other hand, does not show the complement SIP effect. Whether the complement is eventive, stative, or progressive, it is still odd to use *be going to* as an offer.¹¹

⁹It does pass the subinterval property test in a somewhat trivial way, since if the time specified is an instant, there is no way to construct a subinterval of it. However, it is reasonable to assume that the inchoative reading represents a change of state, which we would not expect to have the subinterval property.

¹⁰The fact that wide *be going to* + eventive offering improves with an past or pluperfect antecedent, as below, is because past and pluperfect are +SIP.

(i) We are going to take good care of you after your defense. We plan to start the preparations the minute you go into your defense. At the moment when your committee says, "Congratulations," we will already be in action. ✓If you had told us to decorate your office, we are going to be decorating your office. ✓If you had told us to call everyone you know to invite them, we are going to be calling everyone you know to invite them.

¹¹The same conclusion can be drawn from the fact that *already* is bad in the examples in (225).

(228) Offering: narrow *be going to* has no complement SIP effect

- a. # If you like, I'm already going to give you a call at 4.
- b. # If you like, I'm already going to be on the phone at 4.
- c. # If you like, I'm already going to be talking to you on the phone at 4.

We can't test wide *be going to* for relevance because we don't have the right tests; the *already* test only tells us if the wide reading is present when the narrow reading is absent, and in relevance contexts, the narrow reading is present. But as expected, narrow *be going to* conditionals are permitted in relevance contexts regardless of the SIP value of the complement of *be going to*, because *be going to* is +SIP and is interpreted in the consequent.

(229) Relevance: narrow *be going to* has no complement SIP effect

- a. If you want to come along, I'm already going to go there at 4.
- b. If you want to come along, I'm already going to be there at 4.
- c. If you want to come along, I'm already going to be drinking at 4.

We can test wide *be going to* in causal contexts for the complement SIP effect, since narrow *be going to* does not occur, as in (230).

(230) Indication: narrow *be going to* has no complement SIP effect

- a. If the dogs run around in circles, it's already going to snow. (√indication, #cause)
- b. If the dogs run around in circles, it is already going to be cold. (√indication, #cause)
- c. If the dogs run around in circles, it is already going to be snowing.
(√indication, #cause)

Considering the wide *be going to* conditionals in contexts that rule out indication readings (recall that the fact that *already* is bad in the examples in (231) ensures that these are wide scope readings), we see that the conditional with the progressive complement is impossible:

- (231) Cause: wide *be going to* has complement SIP effect
- a. If you hold the baby horizontally, she's (#already) going to spit up.
 - b. If you hold the baby horizontally, she's (#already) going to be a mad little baby.
 - c. # If you hold the baby horizontally, she's (#already) going to be crying.

The stative is possible, but becomes impossible with *already* just above it. Thus the stative has to be getting a -SIP reading in (231b) in order to allow the causal context.

- (232) If you hold the baby horizontally, she's going to (#already) be a mad little baby.

Our prediction with respect to wide scope +SIP futures is borne out, at least for *be going to*, the only +SIP future that we could reasonably test. Wide scope +SIP futures show the complement SIP effect, getting SIP entailments when their complement is +SIP.¹²

4.2.2 Bare *will* has the complement SIP effect

Bare *will* also shows the complement SIP effect: SIP entailments with +SIP complements, and no SIP entailments with -SIP complements.

While bare *will* + eventive and bare *will* + stative can be used in offering contexts, bare *will* + *already* + stative and bare *will* + progressive are degraded.

- (233) Offering: bare *will* has complement SIP effect
- a. If you like, I'll give you a call at 4.
 - b. If you like, I'll be on the phone at 4.
 - c. ?? If you like, I'll already be on the phone at 4.
 - d. ?? If you like, I'll be talking to you on the phone at 4.

Note that we can perfectly well express an offer to be doing something at a particular time by using *can*:

- (234) If you like, I can be talking to you on the phone at 4.

¹²We cannot tell if wide scope *be going to*, like bare *will*, is unacceptable in contexts that require the SIP entailment to be true, because of the same failing of the *already* test discussed above.

Thus there is nothing anomalous about offering to carry out something that is ongoing at a particular time, it is just that (233d) is not a way to express it.

In relevance conditionals, bare *will* + stative and bare *will* + progressive both get SIP entailments, making them good:

(235) Relevance: bare *will* has complement SIP effect

- a. ?? If you want to know, I'll give you a call at 4.
- b. If you want to know, I'll be back at 4. (=get back at 4 → ??)
- c. If you want to know, I'll already be back at 4.
- d. If you want to know, I'll be talking on the phone at 4.

Finally, bare *will* displays the complement SIP effect in indication and cause contexts, since indication readings are possible with +SIP complements, and cause contexts are possible with -SIP complements.

(236) Indication/cause: bare *will* has complement SIP effect

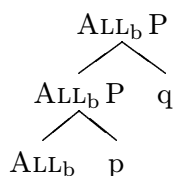
- a. If the dogs run around in circles, it will snow. (#indication, √cause)
- b. If the dogs run around in circles, it will be cold. (√indication, √cause)
- c. If the dogs run around in circles, it will already be cold. (√indication, #cause)
- d. If the dogs run around in circles, it will be snowing. (√indication, #cause)

Therefore, bare *will*, like wide *be going to*, demonstrates the complement SIP effect in all the contexts we have looked at.

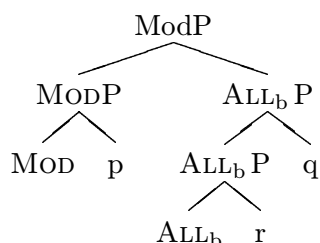
4.2.2.1 On the scope of bare *will*

One question to ask at this point is whether these facts reveal anything about the structure of bare *will* conditionals. Is the modal element of *will* the conditional modal (wide scope, as in (237))? Or is the conditional modal some other modal, with the modal of *will* interpreted in the consequent (narrow scope, as in (238))?

(237) Wide bare *will*?



(238) Narrow bare *will*?



With *be going to* conditionals, it was possible for us to tell where *be going to* was interpreted, because when interpreted in the consequent it triggers the SIP entailment. But there is no higher +SIP element in bare *will* sentences. The most we can say at the moment, I think, is the following. Either bare *will* has wide scope, or, if it has narrow scope, it somehow does not interfere with the mechanism that allows its complement to trigger the SIP entailment. Shortly we will get a better sense of what not interfering would mean, as we give a more detailed account of how the mechanism works. First, however, I would like to say what I can on the question about the unexpectedly missing readings of bare *will*.

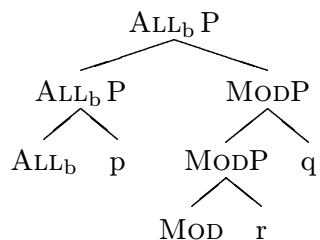
4.2.2.2 On the missing readings of bare *will*

Now, at long last, we are in a position to say more about why bare *will* — really, why bare *will* with an eventive complement — is unacceptable in indication and relevance contexts. Recall that this fact was unexpected because bare *will* seems to make no claim about not-p worlds whatsoever that would contradict the requirements of these contexts.

The fact that -SIP complements are bad in a certain context while +SIP complements are good need not be due to a modal reason. It could just be a result of the present -SIP constraint, which rules out -SIP predicates with present temporal input. But why would there be a present temporal input to the complement of bare *will* in indication and relevance contexts, but not in cause and offering contexts?

It might be, for instance, that in indication and relevance contexts, we have a structure for bare *will* conditionals not considered above. The structure I have in mind is one in which bare *will* is interpreted as the conditional modal, and a lower modal in the consequent, as below:

(239) Super-wide bare *will*?



Then we would need the lower mystery modal to be required to feed its consequent a present temporal input. (We will see below that there are modals with such a property.) However, even if this structure and temporal configuration could be argued for, we would still have to say why the lower modal had to appear in such contexts. We won't get a definitive answer to this question, so this line of speculation will have to remain speculation for now.

4.2.3 Summary

Now that we have some idea of where SIP entailments occur, the next question to ask is how it all works. What do instances of the SIP entailment using different SIP elements have in common? It is reasonable to suppose that complement +SIP predicates have similar effects as SOME_t because the same mechanism is involved in both: namely, the mechanism that was developed in chapter 3 to account for the impossibility of (narrow) *be going to* (= $\text{SOME}_t + \text{ALL}_b$) in offering contexts. In section 4.3, I ask whether the same mechanism could be made to work for the complement SIP effect.

4.3 Implementing the mechanism

Can we explain (for example) the infelicity of (240b) by way of the same mechanism we used to explain the infelicity of (240a)?

(240) a. # We're going to change your oil in Madera.

- b. # We'll be changing your oil in Madera.

Recall first that in offering cases, in order to for the proposed mechanism to be able to explain the SIP entailment, a certain temporal relation has to hold between the antecedent and the consequent. Specifically, the time when it matters whether the hearer wants q or not has to be the same as the time when the offerer is prepared to undertake q . I argued that this is true in offering cases.

In section 4.3.1, I will propose a more general version of this requirement. Wherever the claims in (241) are true, I argue, the mechanism developed in chapter 3 can explain the SIP entailment.

- (241)
- a. The input time of the highest +SIP predicate in the consequent is the same as a certain time in the antecedent (to be defined).
 - b. In certain environments, -SIP predicates get an input time later than the time they seem to receive, while +SIP predicates take the time they receive as their input time.

In sections 4.3.2 and 4.3.3, I will show that these conditions do hold generally, in two different types of conditionals. Section 4.3.4 presents the formal details, and section 4.3.5 presents a puzzle about temporal location in wide *be going to* conditionals.

4.3.1 The mechanism

Let's remind ourselves how the SIP entailment of narrow *be going to* was explained in chapter 3.

Recall that *be going to* is analyzed as having an aspectual operator $SOME_t$ taking scope over a bouletic-inertial modal ALL_b . A conditional with *be going to* in the consequent of a conditional says that all worlds where p is true at t are worlds where $ALL_b(d)(q)(w)(t')$ is true, where t' is some interval properly overlapping t . Then q is true not only on the p worlds (those that d is committed to at t), but on some worlds that are what d wants before t , among which there are (typically) some not- p worlds; since d is presupposed to be able to determine, throughout interval t' , whether q happens, if d is committed to q , it is presupposed that q will happen. This explained why in offering contexts, for instance,

which have a condition that all not-p worlds are not-q worlds, a conditional with (narrow) *be going to* is infelicitous.

One crucial piece of this account was the argument that in present tense conditionals in offering contexts, the time of the hearer's wanting q was the same time at which the director d was prepared to want q on the hearer's behalf and carry it out. However, we did not undertake an analysis of the entire semantics of the *be going to* conditional to understand more generally which times are involved, and how the semantics of the conditional contribute the important temporal relation.

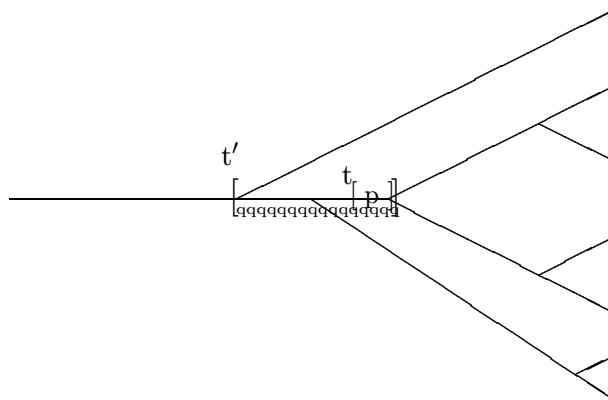
To generalize the temporal relation, let us suppose, to begin with, that the time in the antecedent that matters is the TP input, and that the time in the consequent that matters is the input to a +SIP element.

(242) *SIP entailment condition, first try.*

A conditional will trigger an SIP entailment if and only if the consequent has a +SIP predicate whose input is the same as the antecedent's TP input

Consider now a conditional whose consequent has a +SIP predicate q whose input is the same time as the antecedent TP input, which is the same as the input to p as well. We might represent that state of affairs as below.

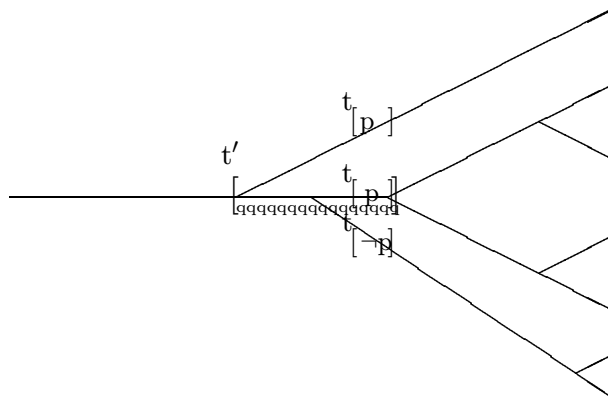
(243)



Recall that the conditional modal, whatever it is, requires that all p worlds are q worlds. Offering requires that all not-p worlds are not-q worlds. We want the conditional with (e.g.) a +SIP q to be infelicitous as an offer on the wide scope reading.

The predicate q has the subinterval property. Thus any subinterval of the interval over which q holds also counts as an instance of q . Consider a world that branches off from the p -world before p but during the run time of q . This is a world consistent with the commitments of d , the director, at the time of branching. This world is a q world, because it contains a little bit of q , and containing a little bit of q is enough to make it a q world, by the subinterval property. This world also could be a not- p world, because it branches off before t . (As we saw in chapter 3, we can generally assume there is such a world in an offering context.)

(244)



Thus the SIP entailment goes through, as desired, explaining why the conditional in question is not felicitous in offering contexts.¹³

Consider now what would happen if q is instead -SIP, but has the same input time as p . Since q is -SIP, a world must include all of q in order to count as a q -world. There are no worlds that include all of q without including some of p , which makes it seem as though the SIP entailment does not arise, as expected. However, if p is also -SIP, then a world that includes only some of p does not count as a p -world. And if some part of q precedes all of p , some not- p worlds are q worlds; this is the SIP entailment, and we have a problem.

Fortunately, this situation actually does not arise. This is where the second claim in (241) becomes important. We will see shortly that -SIP consequents get placed temporally

¹³It does seem that q is asserted to happen before not- p (or p) on these commitment-worlds. But with an assumption of denseness of the timeline you could get arbitrarily close to the time at which p begins. It might then be entailed that q overlaps p at that time, since no part of q cannot include a change of state from the q state to the not- q state.

after the antecedent, not at the same time, because of a systematic shifting of -SIP predicates into the future. Thus the problem does not come up.

4.3.2 Temporal interpretation of antecedent and consequent

We have seen that if we can get the antecedent TP input and the input to a +SIP predicate in the consequent to be the same, we can use an account quite similar to the narrow *be going to* account to explain the SIP effects. Now I would like to show that the temporal interpretation of antecedents and consequents in conditionals provides the needed temporal relation. In order to show this, I will argue that conditionals split into two types with respect to temporal interpretation, depending on what their conditional modal is.

In the first type, *now* is the temporal input to both antecedent and consequent. Thus the antecedent and consequent are not constrained with respect to each other, only to *now*. Modals that yield conditionals of this type include the null epistemic modal and a few other epistemic modals such as *must* and *be possible*.

The second type includes modals such as the various versions of ALL_b . In our denotations of ALL_b so far, the single propositional argument was shifted into the future by a greater-than relation. We will add a propositional argument to the denotation (since conditionals have two clauses). Then we will replace the greater-than relation in either clause with something I will call the *placement relation*, which more accurately accounts for the temporal facts. Finally, we will see that the consequent placement relation input is the same time as the antecedent placement relation output. This accounts for the observation that in many cases, the run time of q has to either overlap or follow the run time of p , as well as systematic exceptions to that generalization.

In the next two sections, I will present evidence for two lemmas that are generalizations about the temporal relation between the clauses in conditionals: Lemma 1 for the first type of conditionals, and Lemma 2 for the second type. Then I will show how the truth of these lemmas entails that the temporal condition on SIP entailments permits the conditions for the SIP entailment to arise in the correct environments, thereby accounting for the complement SIP effect.

4.3.2.1 Lemma 1: Type 1 conditionals

The lemma I will argue for here is the following:

- (245) *Lemma 1:* In type 1 conditionals, the TP input of the antecedent and the TP input of the consequent are both *now*.

I will argue for this lemma by considering conditionals with no overt modal that are not obviously generic or relevance conditionals. The conditional modal in such cases I assume to be a null epistemic modal EP. EP has universal force and an epistemic modal base; in contrast to the metaphysical modal base, this modal base consists of worlds which, for all the speaker knows, could be the actual world. (The reader can verify that the other modals mentioned as being in this category, epistemic *must* and *be possible*, have the same temporal properties; see also Iatridou (1990) for discussion).

After arguing for Lemma 1, I will demonstrate that the temporal properties of EP allow the antecedent TP input and the consequent +SIP input to be the same when the +SIP element in question is the highest predicate in the consequent that does not involve an identity relation on times.

Consider first present tense conditionals that lack an overt modal. Lexically stative predicates are possible in both antecedent and consequent.

- (246) If Barbara is here now, Steph is here now too.

However, the run times of these statives have to include *now*, meaning that the input to both statives is *now*. If the speaker intends lexical statives to have run times after now, they need to be futurates. The examples in (247), which respectively have a stative with future run time in the antecedent, consequent, and both, are only acceptable on the reading that the clauses about tomorrow are really talking about present plans for tomorrow.

- (247) a. If Barbara is here tomorrow, Steph is here now.
b. If Barbara is here now, Steph is here tomorrow.
c. If Barbara is here tomorrow, Steph is here tomorrow (too).

An unplannable predicate like *be sick* is not good in either the antecedent or consequent:

- (248) a. # If Barbara is sick tomorrow, Steph is here now.
 b. # If Barbara is here now, Steph is sick tomorrow.
 c. # If Barbara is sick tomorrow, Steph is sick tomorrow (too).

Futurates, we have said, are always +SIP. The reason, I argued, is that both PROG and GEN have, as their highest component, a +SIP aspectual element, either $SOME_t$ or ALL_t . Thus we can say so far that in both clauses, EP seems to require +SIP predicates. Either statives or eventives can appear under PROG or PAST, both of which we have demonstrated to be +SIP:

- (249) a. If John is eating, Celeste is eating.
 b. If John is being nice, Celeste is being nice.
 c. If Celeste was here, John was here.
 d. If Celeste left, John left.

Present and past can also be mixed and matched, as in (250).

- (250) a. If Andrea is there now, Celeste left.
 b. If Andrea left, Celeste is there now.

Note that the run times of the antecedent and consequent are *not* constrained with respect to each other. Suppose that we know Celeste always leaves a party an hour after John does. Then we could utter (251a) in reasoning from the time of John's leaving to the time of Celeste's leaving. Or if she always leaves a party an hour earlier, we could use (251b). If they always leave together, we could use (251c).

- (251) a. If John left at 5, Celeste left at 6.
 b. If John left at 6, Celeste left at 5.
 c. If John left at 6, Celeste left at 6 too.

This relative freedom is, incidentally, not the usual state of affairs. For one, it stands in marked contrast to sequence of tense phenomena, in which the run times of two eventualities (one in the matrix, one embedded) are constrained with respect to one another. With an embedded stative, as in (252) below, the Marissa-being-here time has to either overlap the

Tasha-saying-so time, or precede it; (252c) is not good, but improves with a plannable eventuality as in (252d), so again, it can only be a futurate reading.

- (252) a. On Monday Tasha said that Marissa was sick.
b. On Monday Tasha said that Marissa was sick on Sunday.
c. # On Monday Tasha said that Marissa was sick next week.
d. On Monday Tasha said that Marissa was here next week.

We will also see later that the other type of conditional does not permit the antecedent and consequent to be temporally unrelated.

Since the requirement seems to be that the antecedent and consequent both need to have the subinterval property, and need have no particular relation to each other, we can fairly say that the input to both the antecedent TP and the consequent TP must be *now* (and the present -SIP constraint is at work). So, for at least these kinds of epistemic conditionals, QED Lemma 1.

Now, remember that we need to show that a particular temporal relation holds, from which it will follow that the mechanism for explaining the SIP entailment will work. The requirement is that the antecedent TP input must be the same as the input to the +SIP element in the consequent. In the case of type 1 conditionals, if Lemma 1 holds, the TP times are the same. If in addition the highest temporal predicate in the consequent is +SIP (like PAST, GEN, PROG, or a lexical stative) then the temporal requirement holds. As desired, these are just the cases in which the SIP entailment arises.

Now let us see if we can obtain a similar result for type 2 conditionals.

4.3.2.2 Lemma 2: Type 2 conditionals

The lemma for this section is as follows.

- (253) *Lemma 2:* In type 2 conditionals, there is a placement relation (to be defined below) in both the antecedent and the consequent. The antecedent placement relation output and the consequent placement relation input (= consequent TP input) are the same.

To begin with, let us see which temporal and stativity combinations are possible in conditionals that have a type 2 modal, such as bare *will* conditionals.

Like type 1 conditionals, type 2 conditionals can generally have statives whose run times include the present.

- (254) If Barbara is here now, Steph will be here now too. (cf. (246))

However, unlike type 1 conditionals, type 2 conditionals can also have statives and eventives, in either the antecedent or the consequent, with run times in the future but which are not futurates. We show this, as usual, by demonstrating that unplannable eventualities are felicitous. (Admittedly, the contexts for some of these are a little strange.)

- (255) (cf. (247))

- a. If Barbara is sick tomorrow, Steph will be sick tomorrow.
- b. If Barbara is sick tomorrow, Steph will be sick now.
- c. If Barbara is sick now, Steph will be sick tomorrow.

So type 2 conditionals, unlike type 1 conditionals, permit future eventualities that are not futurate. What is going on here?

In a number of different modal environments, a morphologically present tense stative or progressive can have a run time either overlapping *now* or entirely in the future, and morphologically present tense eventives can only be in the future.¹⁴

- (256) a. Dale must be here at the moment.
b. Dale must be here tomorrow.
c. *Sandy must leave at the moment.
d. Sandy must leave tomorrow.

¹⁴We leave aside here sports broadcasts, screenplays, and the like.

- (257) a. For Dale to be here at the moment is surprising.
 b. For Dale to be here tomorrow would be surprising.
 c. * For Sandy to leave at the moment is surprising.
 d. For Sandy to leave tomorrow would be surprising.

The examples given above share an inability of non-statives to happen *now*, and an ability of statives to happen either *now* or in the future. The inability of non-statives to overlap *now* is due to the present -SIP constraint.

- (258) present -SIP constraint
 for all -SIP p, w:
 $p(w)(now)$ is undefined

Since lexical statives seem able to take future input times, perhaps we should define our new relation as follows:¹⁵

- (259) “ $\exists t' \triangleright t: [p(w)(t)]$ ” is an abbreviation for “ $\exists t' > t: [p(w)(t')]$ ” if p is -SIP, and “ $\exists t$ includes or is later than t: $[p(w)(t')]$ ” if p is +SIP.

But there are reasons to think otherwise. Recall that lexical statives can be coerced into inchoative readings; “real” statives, as diagnosed by the acceptability of *already*, triggered the SIP entailment. Therefore, according to what we have said about how the SIP entailment is produced, these +SIP statives must have had a present input time. (Inchoative readings, on the other hand, did not trigger the SIP entailment.)

Recall as well that the version of the subinterval property we are using is, as in Dowty’s original conception of it, a property of predicates of times. More recently, it has largely been treated as a property of predicates of events.¹⁶ We have, though, a compelling reason to use times rather than events. While event arguments are thought to be confined to the

¹⁵Condoravdi (2001) has a function which is meant to do similar work to the relation in (259) (“ \circ ” denotes temporal overlap): $AT(t,w,P) = \exists e[P(w)(e) \ \& \ \tau(e,w) \subseteq t]$ if P is eventive, $\exists e[P(w)(e) \ \& \ \tau(e,w) \circ t]$ if P is stative, $P(w)(t)$ if P is temporal. The input to this function in the case of the present tense is a kind of extended-now. With an input that stretches from now into infinity, however, it is difficult to account for cases that do not allow lexical statives to have future run times, such as the statives we observed in type 1 conditionals.

¹⁶Or situations, which would work here as well.

vP , the subinterval property, I have been arguing, affects modal ALL_b exactly as we would expect it to if it were a property of predicates of times.

If the subinterval property, then, is a property of predicates of times, there seems no reason why it should not hold of predicates of times that never seem to take event arguments, such as PAST, for instance.

Recall that PAST is a predicate that can occur with a *now* input. In fact, it must have a *now* input; if it didn't, and could take a future input instead, we might expect that the eventuality (260) could have a run time in the future with respect to *now*, but in the past with respect to the future input.

(260) John left.

Obviously this is not the way PAST works. Matrix PAST has to take a present input, and is not allowed to take a future input.¹⁷

Taking these arguments into consideration, let's assume that the relation in question — the *placement relation*¹⁸ — says that run times of +SIP predicates must include (\supset) and run times of -SIP predicates must follow ($>$) the input time. So the definition for the placement relation that we want is the following:

(261) “ $\exists t' \supset t: [p(w)(t)]$ ” is an abbreviation for “ $\exists t' > t: [p(w)(t')]$ ” if p is -SIP, and “ $\exists t' \supset t: [p(w)(t')]$ ” if p is +SIP.

Returning to type 2 conditionals, it looks like what we have is the placement relation in both the antecedent and the consequent: eventives (-SIP) can have only future run times, but statives (either +SIP or -SIP) can either overlap or follow *now* (where, when they follow *now*, they presumably are really -SIP). Type 1 conditionals, on the other hand, must not have a placement relation, because they only allow predicates to overlap *now*. They are slaves to the present -SIP constraint, which says that $p(w)(now)$ is not permitted for a p that is -SIP. However, there is no constraint that says you can't feed the placement relation

¹⁷This was why Condoravdi defines her “temporal” case in terms of overlap; but the point here is that temporal predicates are not a special case.

¹⁸Where does the placement relation come from? Cf., perhaps, discourse effects (ter Meulen (1995), e.g.): In *John came in. Mary was there.* the stative run time must include eventive run time; in *John came in. Mary left,* Mary's leaving must follow John's coming in.

a -SIP proposition; in that case, the -SIP predicate's temporal input is not now, but some later time.

How are the input and output times of the two placement relations in a type 2 conditional related? It turns out that in type 2 conditionals, no part of the run time of q can be before any part of the run time of p, excluding cases where p is futurate.

Let's call the situation in which some of the run time of q is before the run time of p, "switching". Switching is possible in type 1 conditionals; as we saw above, the run times are not dependent on each other at all. The eventuality described in the consequent can indeed take place before the eventuality described in the consequent. In type 2 conditionals, however, while the two run times are allowed to overlap if q is stative, any attempt to have an antecedent's run time later than the consequent's run time results in a futurate reading; that is, it behaves like it is a +SIP predicate overlapping *now*, so it really is not switching at all.

- (262) a. If Celeste leaves tomorrow, John will be in his office now.
b. If Celeste leaves on Thursday, John will be in his office tomorrow.

Since, as I argued above, there is also an instance of the placement relation operating in the consequent, our first suspicion should be that the placement output of p is used as the placement relation input for q (i.e., the TP time of q). In that case q could never be before p without some sort of anterior operator like PAST.

This seems to be true. For example, the Don-in-office time in (263a) cannot be entirely before 5, but it can either overlap 5 or be entirely after it.¹⁹ In (263b), though, there can be no simultaneity of the lights' coming on and Don's going home; he goes home after, if only slightly.

- (263) a. If the lights are on at 5, Don will be in his office.
b. If the lights come on at 5, Don will go home.

This is exactly what we expect if the placement output of p is the placement input for q and there is no other temporal/aspectual morphology in q. When there is temporal morphology

¹⁹The overlapping (+SIP) option of the placement relation thus accounts for the existence of so-called "epistemic" *will* cases, in which the stative overlaps *now*.

in *q*, such as *have*, the *vP* input of *q* is shifted accordingly. (That is how we know that it is the TP input, not, say, the *vP* input, that is also the placement input.) In any case, as expected, the consequent run time is allowed to be earlier.

(264) If the lights come on at 5, Don will have gone home.

QED Lemma 2, at least for bare *will* conditionals.

Now, to derive what we were aiming at: that this temporal relation between antecedent and consequent allows the SIP entailment condition to arise in type 2 conditionals where the facts show it does.

SIP entailments, we said, should occur when the consequent input to an +SIP predicate is the same as the antecedent TP input. This relation is entailed by the relation in Lemma 2 in a situation where there is a +SIP predicate with no -SIP predicates above it. Therefore, in type 2 conditionals of the kind we have looked at, we have derived the SIP mechanism in the appropriate situation.

4.3.2.3 Which conditional is which?

All that remains, then, is to confirm that the contexts we looked at in section 4.1 permit either type 1 conditionals, type 2 conditionals, or both. If they all behave one way or the other (or both), we are done explaining complement SIP effects.

Consider first the conditional contexts that are incompatible with the SIP entailment; offering and cause. Right away we can say that those cannot be type 1 conditionals and must be type 2 conditionals; they permit future-oriented, non-futurate readings, as shown in (265a) (offering) and (265b) (cause).²⁰

- (265) a. If it rains tomorrow, I'll wash the car for you the day after tomorrow.
b. If it rains today, it'll keep raining tomorrow.

However, contexts that are compatible with the SIP entailment could be either type 1 or 2. We will look at conditionals in relevance and indication contexts, and apply two

²⁰Actually, the consequent of an offer does have to be plannable, but I suspect that this is due to a pragmatic restriction rather than a temporal-aspectual restriction; you can't offer to do *q* if you do not direct *q*.

tests. If a conditional can have the run time of the consequent precede the run time of the antecedent without resorting to futurates (“switching”), it has a type 1 reading. If it can’t, it does not. If a conditional permits future run times for non-furates, it has a type 2 reading. If it does not permit future run times for non-furates, it does not.

Relevance contexts seem to permit both:

- (266) a. If you finished already, we bought some beer. switching possible (q run time could precede p run time)
- b. If you do end up finishing early, we’re going to go get some beer. future run time possible for non-furate

Indication contexts seem to permit both as well:

- (267) a. If the baby is crying, her brother made a face at her. switching possible (q run time could precede p run time)
- b. If the baby cries, she’s going to spit up. future run time possible for non-furates

More investigation is certainly warranted to determine exactly which modals (null or pronounced) are the conditional modals in the examples in (266) and (267). (In light of the question asked earlier about the impossibility of bare *will* with -SIP complements in these contexts, it would definitely be nice to know the structure of these examples.) However, for our present purposes, in both type 1 and type 2 conditionals, we may conclude that we can account for the SIP entailments.

4.3.2.4 Why the SIP value of p doesn’t matter

I have argued for two different kinds of conditionals, each with a different temporal relationship between antecedent and consequent. Type 1 conditionals, I argued, have the same TP input for both the antecedent and the consequent, while in type 2 conditionals, there are placement relations in both clauses, and the antecedent placement output is the consequent placement input. We found that the SIP mechanism could be derived in both cases, which was necessary to show because the SIP entailment can arise in both type 1 and type 2 conditionals.

We have seen that the SIP value of the consequent certainly has detectable effects on judgments in contexts where it matters whether the not-*p* worlds are *q* worlds. But the SIP value of the antecedent never seems to matter. Let's demonstrate this briefly. Suppose that the antecedent is +SIP, and that some of its run time precedes the run time of a stative in the consequent. In that case the *q* worlds are all included among the *p* worlds (because there is no "overhang" of *q* on the left as in the cases we have discussed). Nothing so far explicitly rules out this state of affairs, so perhaps it can arise. If it can arise, then in such cases, we expect no SIP entailment. But this is not so; with a +SIP element interpreted in the consequent, statives always get the SIP entailment, regardless of whether there is a stative in the antecedent. For example, despite the stative antecedent in the narrow *be going to* conditional in (268) is still not good in a cause context.

(268) If the baby is tired right now, she's already going to cry. (\surd /indication, #cause)

Evidently, then, the run time of the antecedent, even if the antecedent is +SIP, is not allowed to have any part preceding the run time of the consequent. Why? To answer this question, let's consider in turn both types of conditionals.

Consider first a type 1 conditional, in which a +SIP antecedent and +SIP consequent both have *now* as their TP input (Lemma 1). If there is no intervening temporal/aspectual operator, in principle their run times might be such that some of the run time of *p* precedes the run time of *q*. However, this would not be compatible with the semantics of the conditional modal itself, as we can see if we apply our mechanism once more. For if some of *p* precedes *q*, some worlds that split off before *q* are *p* worlds, because *p* is +SIP and therefore has the subinterval property, so all you need is a little bit of *p* in order to be a *p* world. But some of these worlds are not-*q* worlds, because they split off before *q*. Thus not all *p* worlds are *q* worlds, contradicting the semantics of the conditional modal, which say that all *p* worlds are *q* worlds. So such a case could never arise.

Wait a minute, though. How would this work with a past antecedent? Consider a type 1 conditional with a past antecedent, and a present +SIP consequent, as in (269).

(269) If Marissa was here yesterday, Tasha is here now.

Why couldn't we do the trick here, too, and say that (269) conflicts with the semantics of

the conditional? After all, part (actually all) of p precedes q , and p is stative, so it has the subinterval property, therefore any worlds that split off during the run time of p are p worlds, and (typically) some of them are not- q worlds. Thus again, not all p worlds are q worlds, which is not allowed. Yet (269) is a perfectly fine type 1 conditional.

The error in the argument is the reference to worlds that split off during the run time of p ; worlds that branch off in the past are no longer available. Recall that the direction presupposition says that the director directs the future from the perspective of *now* or in intervals including *now*. Any time not overlapping now is therefore settled with respect to the director's desires; they can't change the past even if they want to. We know that counterfactuals have past morphology that takes us back to a past time to do the branching by use of past morphology that affects the perspective of the conditional modal (Iatridou, 2000; Ippolito, 2002). Naturally, without that morphology, we do not expect the branching to be available. Since we are not allowed to consider worlds that branch off during the run time of p , there is no problem.

The type 2 case is quite a bit more straightforward. Since, as per Lemma 2, the antecedent placement output is the consequent placement input, any stative in the consequent has a run time which is a superinterval of that input time. So the antecedent stative run time (=placement output) is necessarily an internal interval of the consequent stative run time, and so the problem does not arise.

For now, let's formalize.

4.3.3 Formal details

4.3.3.1 Temporal location and aspect

The present -SIP constraint is as follows:

- (270) Present -SIP constraint
 For all -SIP p , and for all w ,
 $p(w)(now)$ is not defined.

Here is the placement relation again, which yields different results according to whether the propositional argument is + or -SIP.

(271) “ $\exists t' \triangleright t: [p(w)(t)]$ ” is an abbreviation for “ $\exists t' > t: [p(w)(t')]$ ” if p is -SIP, and “ $\exists t' \supset t: [p(w)(t')]$ ” if p is +SIP.

Past tense:

(272) $[[\text{PAST}]^g(p)(w)(t) = 1 \text{ iff } \exists t' < t [p(w)(t')]$

We will assume that present tense is zero.

4.3.3.2 Denotation of EP

Recall Lemma 1, which said that the TP times for both antecedent and consequent are the same, and in fact were both *now*. Only +SIP predicates are allowed, in either clause. This is not consistent with a placement relation, which would allow future-oriented predicates. Therefore EP does not introduce any instances of the placement relation; a denotation is given in (273).

(273) $[[\text{EP}]^g(p)(q)(w)(t) = 1 \text{ iff } \forall w' \text{ epistemically}^{21} \text{ accessible from } w \text{ at } t [p(w')(t) \rightarrow q(w')(t)]$

Here is EP with statives, as in (274); the statives must be evaluated *now*.

(274) If Don is here, Barbara is there.

(275) $[[\text{EP}]^g(p_{+SIP})(q_{+SIP})(w)(now) = 1 \text{ iff}$
 $\forall w' \text{ accessible from } w \text{ at } now [p_{+SIP}(w')(now) \rightarrow q_{+SIP}(w')(now)]$

Note that EP cannot take any -SIP arguments, because the expression $p_{-SIP}(w')(now)$ violates the present perfective constraint.

EP can take clauses that have PAST in them, because PAST is +SIP. Even if the predicate under PAST is itself -SIP, that does not matter, because it does not have to take *now* as an input.

(276) If Devon left, Dave is here.

²¹Certainly there should be someone to do the epistemizing, as it were. We will not worry about this.

$$(277) \quad \begin{aligned} & \llbracket \text{Ep} \rrbracket^g (\llbracket \text{PAST} \rrbracket^g) (p_{-SIP}) (q_{+SIP})(w)(now) = 1 \text{ iff } \forall w' \text{ accessible from } w \text{ at } now \\ & \llbracket \llbracket \text{PAST} \rrbracket^g (p_{-SIP})(w')(now) \rightarrow q_{+SIP}(w')(now) \rrbracket = 1 \text{ iff } \forall w' \text{ accessible from } w \text{ at} \\ & \text{now } [t' < now \ \& \ p_{-SIP}(w')(t') \ \& \ q_{+SIP}(w')(now)] \end{aligned}$$

The expression $p_{-SIP}(w)(t')$ does not violate the present perfective constraint, because t' is not *now*.

4.3.3.3 Denotations of type 2 modals

In the discussion of Lemma 2 above, we saw evidence that there is an instance of the placement relation in each clause. Furthermore, the consequent placement input is the antecedent placement output.

For ALL_b in its various incarnations, this result is achieved with the following denotation, altered from the earlier denotation of bare *will* only by the insertion of an antecedent, and placement relations on the antecedent and consequent, to account for Lemma 2.

$$(278) \quad \begin{aligned} & \text{ALL}_b(d)(p)(q)(w)(t) = 1 \text{ iff } \forall w' \text{ metaphysically accessible from } w \text{ at } t \text{ and} \\ & \text{consistent with } d \text{'s commitments in } w \text{ at } t: [\exists t' \triangleright t: [p(w')(t')]] \Rightarrow \exists t'' \triangleright t': [q(w')(t)] \\ & \text{Presupposed: } d \text{ directs } p \text{ in } w \text{ at } t \end{aligned}$$

4.3.3.4 Summary

In this section, I have shown that the mechanism from chapter 3 can be adapted to explain the complement SIP effect. I first identified what would have to be true about temporal interpretation in conditionals in order for the explanation to be applicable, and then demonstrated that temporal interpretation in conditionals in fact behaves in that way.

Before concluding this chapter, I would like to consider some facts which the preceding analysis does not explain.

4.4 Simultaneous states

Apparently, in narrow *be going to*, a stative complement of *be going to* cannot overlap the present. To show this, we will need to see whether a stative complement has to be pushed

to the future in narrow *be going to*. This seems to be the case, in contrast to *will* and wide *be going to*. A relevant example for *will* is in (279); it allows the states to be simultaneous.

(279) If Delaney's at a movie right now, she'll be at the Amherst.

Be going to, with its two scopal readings, is a little more difficult. At least one reading of *be going to* is fine with the run time of the complement stative interpreted *now* as well. Suppose we are arguing about where we can find Delaney. I could say:

(280) If Delaney's at a movie right now, she's going to be at the Amherst (because that's her favorite theatre).

But is this *be going to* wide *be going to*, narrow *be going to*, or both? The fact that it is odd with *already* means that it is not narrow *be going to*.

(281) # If Delaney's at a movie right now, she's already going to be at the Amherst.

Therefore the acceptable (281) must be wide *be going to*.

Likewise, verb phrases p and q can also both happen simultaneously in the future with *will*, but not with narrow *be going to*, only with wide *be going to*.

(282) If Delaney is at a movie when we call her tomorrow, she is (#already) going to be at the Amherst.

With a present futurate in the antecedent and a present stative in the consequent, only *will* is possible. This too supports the idea that narrow *be going to* cannot have overlapping states. Suppose that John Paul's father Jeff has been away on business, and is supposed to get home tomorrow. Also suppose that John Paul wants all his stuffed animals to say hi to his dad when he gets home, and that he has to spend a considerable amount of time coaching them beforehand. With *be going to*, it is not possible to have a conditional with a present futurate antecedent and a stative whose run time includes *now* in the consequent.

(283) a. If Jeff gets home tomorrow, John Paul will be in his room at the moment getting his stuffed animals ready.

b. ?If Jeff gets home tomorrow, John Paul is going to be in his room at the moment getting his stuffed animals ready.

However, with a future-oriented stative in the consequent, and thus no simultaneity of states, both *will* and *be going to* are good.

- (284) a. If Jeff gets home tomorrow, John Paul will be in his room when we come by tonight, getting his stuffed animals ready.
- b. If Jeff gets home tomorrow, John Paul is going to be in his room when we come by tonight, getting his stuffed animals ready.

We know that this is narrow *be going to* instead of wide *be going to* because *already* is fine:

- (285) If Jeff gets home tomorrow, then when we come by tonight, John Paul is already going to be in his room, getting his stuffed animals ready.

But with a present state and *at the moment*, *already* is no good, so it must be that the narrow scope reading has been ruled out.

- (286) ?? John Paul is already going to be in his room at the moment.

We should note that we can use the possibility for simultaneous states as a test for wide *be going to*: if a *be going to* sentence allows simultaneous states, it allows the wide scope reading. This is an important addition to the *already* test, which only detects the presence of the narrow scope reading. When *already*, and therefore the narrow scope reading, is possible, we can detect whether the wide scope reading is possible too.

Nonetheless I'm not sure why it is so. One possibility is that for some reason, the stative under narrow *be going to* must be interpreted as +SIP, placing it in the future with respect to *now*. Yet as the relevance example in (287) shows, narrow scope *be going to* permits *already* in front of the stative, showing that the stative really is getting a +SIP interpretation.

- (287) If you want to know, we're going to already be there when you get there.

So perhaps this option is not possible after all.

Another possibility is that there is a null eventive antecedent (call it *r*) as the first argument of narrow *be going to*. Then the run time of the consequent must be future with respect to the placement output of *r*, which itself has the same placement input as the

placement output of the overt antecedent (the first argument of EP), because *be going to* is +SIP. Thus the consequent has a later run time than the run time of the antecedent.

We still would have to say why there couldn't be a null stative antecedent, and why it seems to be preferred for *be going to* to be low and have a null antecedent (since wide *be going to* is often somewhat difficult to for speakers to get at first).

4.5 Conclusion

In this chapter we have seen how futures and, to some extent, futurates behave in conditionals. The presence of the SIP entailment (some not-p worlds are q-worlds) was shown to correlate with whether the highest predicate interpreted in the consequent was +SIP. This gave us a means by which to determine the scope of +SIP modals.

I further showed how the mechanism developed in chapter 3 to explain the SIP entailment could be generalized for cases in which the highest +SIP predicate was lower than a modal. This argument prompted a tour through the temporal interpretation of antecedents and consequents, leading to the generalization that there are two different kinds of temporal interpretation in conditionals, depending on the kind of conditional modal used. I presented a further question about temporal interpretation in narrow *be going to*.

Chapter 5

Conclusion

To do something new, of course we must know our past, and this is all right. But we should not keep holding onto anything we have done; we should only reflect on it. And we must have some idea of what we should do in the future. But the future is the future, the past is the past; now we should work on something new.

-Shunryu Suzuki
Zen Mind, Beginner's Mind, 1970

The ultimate goal of the research project begun in this dissertation is to better understand the means of future reference available to the human language faculty, by determining, in as many genetically and geographically diverse languages as possible, the meanings of constructions that refer to the future. What was presented here was a semantic theory of four English constructions which are used to speak with a high level of confidence about the future. This theory provided explanations for various facts, raising various questions in the process.

5.1 Facts explained

The meaning of futurates and futures, I argued, involves an aspectual operator on top of a bouletic-inertial modal. The higher aspectual operator has detectable effects on which worlds are quantified over by the modal. These effects helped us determine the relative

scope of various overt and covert modals in conditionals.

I introduced the concept of direction, which proved helpful in explaining the bouletic ordering of futures and futurates; I further suggested that the inertial ordering should be unified with the bouletic ordering.

Futurates, I argued, derive their modal and aspectual properties from the properties of generic and progressive operators.

5.2 Remaining questions

A number of questions still remain. Throughout this research I have been struck by the number of distinctions that have proven relevant: distinctions of aspect, of ordering, of future versus futurate, and of scope. In this dissertation I have not explored whether the choice of one of these affects the choice of the others. Is this the case? If so, how?

We saw that the subinterval property was relevant in a position higher than the future modal ALL_b . How should the subinterval property be represented, if not with event arguments? What principles account for where aspectual operators can appear in the structure of the clause?

If directors are indeed visible to the syntax, as I argued, when must an agent be a director?

What is the precise characterization of the differences between futurates and futures? How, for example, does the extra presupposition in the semantics of generic futurates fall out of a compositional analysis, when it apparently does not arise in generic futures?

What does the analysis as it stands tell us about how the modal system and the temporal system interact? Are the aspectual and modal components of futures and futurates utilized in the denotations of other modals?

Finally, to what extent does future reference in other languages behave as future reference in English does? We saw, for example, in chapter 4 that the null epistemic modal EP cannot refer to the future. This is true of epistemic modals in general (see Iatridou (1990) for more discussion):

- (288) a. # If it doesn't rain tomorrow, the Red Sox must win.
 b. # If it doesn't rain tomorrow, it is possible that the Red Sox win.

Epistemic modals cannot refer to the future, and, as we saw, the modality of futures and futurities is apparently not epistemic. However, in other languages, it is not clear that we can make such a statement. Japanese uses the same modal for future, unplannable eventualities as it does to express epistemic indeterminacy about the past or present:

- (289) Japanese
- a. Ashita Tokyo-ni iku (#deshoo).
 tomorrow Tokyo-to go probably
 'Tomorrow I (will?) go to Tokyo.'
- b. Ashita ame furu #(deshoo).
 tomorrow rain fall probably
 'Tomorrow it will rain.'
- (290) a. Tanaka-ga iru deshoo.
 Tanaka-nom be probably
 'Tanaka is probably there.'
- b. Tanaka-ga itta deshoo.
 Tanaka-nom be-past probably
 'Tanaka was probably there.'

Thus it is premature to conclude that the only way to talk about the future is the means whose outline we have begun to faintly distinguish here; something quite different could be at work in Japanese.

This is where I normally would say that I will have to leave these questions for future research. But since future research is what I have been doing all this time, I suppose I will have to leave these questions for future future research.

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